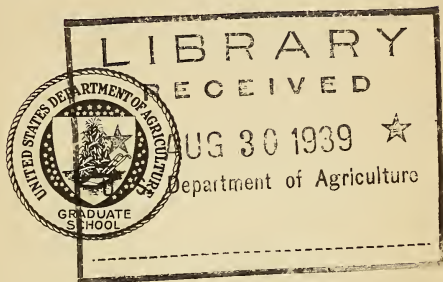**Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.

THE DEPARTMENT
OF AGRICULTURE
GRADUATE SCHOOL

EDUCATIONAL COURSES MAKING
FACILITIES AVAILABLE FOR
STUDY AND RESEARCH IN
THE GOVERNMENT SERVICE

1939=40

WASHINGTON

CONTENTS

GRADUATE SCHOOL
DEPARTMENT OF AGRICULTURE

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Courses for 1939-40

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AMENDMENTS

Page

5—*Auditing (3 cr.)

5—*Income Tax Law and Procedures (Instructor to be announced)

5—Include *Elementary Cost Accounting—Elmer C. Koch; Monday, 7:35 to 10:05. (See A. U. catalog) (3 cr.)

9—Wylie D. Goodsell instead of O. E.

9—*Current Social Legislation (To be offered the spring semester)

9—*State and Population (To be offered the spring semester)

10—Gardiner C. Means instead of Gardner

17—Prerequisites for Statistics 9 and 10 should be: A course in Introduction to Statistical Analysis

19—Horace R. Byers instead of Horace G.

22—*Commercial Law — Mr. Walter H. Young; Tues. from 5 to 7:30 commencing Sept. 26th. (3 cr.)

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The following courses, in addition to those starred in the catalog, are cooperative with American University:

Page

14—*Elementary Russian

14—*Lectures on Russian Literature

22—*Source Material for Research in the Social Sciences

22—*Fundamentals of Speech

22—*Effective Speaking

22—*Argumentation and Debate.

THE DEPARTMENT OF AGRICULTURE
GRADUATE SCHOOL

COURSES FOR 1939 - 40

FIRST SEMESTER BEGINS SEPTEMBER 25, 1939

The tuition will be $12 a semester for two hours a week studies and $18 a semester for three hours a week studies, except as otherwise indicated. Those who desire college or graduate credits certified to a university or to the Civil Service Commission will pay $7.50 a credit hour. Students withdrawing from classes will not be entitled to refunds, except that if an announced course is not given for want of the minimum number of students (15), money paid will be returned in full.

REGISTER IN ADVANCE. No one will be admitted to class without a registration card. Registrations for the first semester should be completed before September 21st.

Those desiring courses in subjects not included in this program should confer with others interested to see if there are enough applicants to make a self-supporting class. The minimum number required in most cases is fifteen, but special arrangements may be made with the approval of the instructors for the conduct of smaller classes.

Special series of lectures not included in this preliminary statement will be announced from time to time as plans for them are completed.

The latest catalogs of universities and colleges are available for consultation in the office of the Director. Inquiries regarding the school should be addressed to Dr. A. F. Woods, Collaborator, and Director of the Graduate School, Room 1031, The Department of Agriculture, Washington.

Room assignments for classes may be obtained from the Director's Office after September 21st, or from the guards at the main entrances.

Any student working for academic credit should secure from the schools attended a transcript of his academic work and file it with the Secretary of the Graduate School, Mrs. Eva M. Johnson.

AUTHORITY AND OBJECTIVES

The Congress of the United States has enacted special provision for making the facilities for study and research in the government departments available to qualified individuals, students, and graduates of institutions of learning in the several States and the District of Columbia under such rules and restrictions as the heads of departments and bureaus may prescribe (Joint Res. April 12, 1892, 27 Stat. 395; Deficiency Act of March 3, 1901, 31 Stat. 1010, 1039.) Under this authority and the provisions of the Organic Act, a School of Graduate Studies was organized with the approval of the Secretary of Agriculture in 1921 for the benefit of Department employees and such others as are qualified to undertake the work offered.

Some of the strongest scientists of the government departments are taking charge of courses and a few of the leading graduate institutions in and near Washington have furnished teachers for others. The professional staffs of the various bureaus are mostly in the Civil Service and hold their positions by reason of merit. Most of them were originally drawn from the staffs of the leading colleges and universities, and are now practicing the subjects that they teach. Altogether a most

helpful spirit has prevailed. The interest in the school has grown from year to year. Its work has been strengthened and credits granted have been accepted for graduate and undergraduate credit in all institutions where they have been offered. These include most of the leading universities of the country and the Civil Service Commission.

As the work developed it became increasingly necessary to offer courses in the undergraduate levels to enable students to work out programs acceptable to graduate schools in which the student desires to register for an advanced degree. The course levels are indicated in the catalog by Roman numerals e.g., I, freshman; IV, senior; V, graduate.

Executive Order No. 7916 authorizes and directs "the establishment of federal training facilities in and by the Departments and Agencies and by the Civil Service Commission."

Students are urged to register for work desired in local colleges when practicable. By special arrangements with some nearby institutions, especially American University, cooperative courses are organized and are available for resident credit. These are indicated by an asterisk (*). Every effort is made to insure the highest possible standard of work, so that it may be satisfactory to the government service and cooperating colleges.

Graduate credit can be obtained only by persons having a bachelor's degree from an accredited college, and undergraduate credit only by those who have fifteen units of standard work from an approved high school. Classes meeting two clock hours a week for fifteen weeks carry two semester credits; those meeting three hours carry three semester credits. Classes running through the year earn double this number, i.e., four or six semester credits respectively. Only courses marked III, IV, V may be used in graduate programs, those marked III and IV for minors, V for majors. Courses in the first and second levels (I and II) may be required without credit if necessary for foundation training.

Work for the master's degree is largely "resident" work at the institution where the degree is to be taken. Not more than six units, as a rule, may be taken at another institution.

The Department Library in room 1052 will be open from 4:30 till 6 on Fridays for students who can not conveniently go there during the regular hours.

DETAILED DESCRIPTION OF COURSES

The asterisk (*) indicates cooperation with American University. Roman numerals indicate college year levels.

All credits are indicated on a semester basis.

ACCOUNTING

Undergraduate

PRINCIPLES OF ACCOUNTING (I)—Dr. Oswald Nielsen, Messrs. Wm. H. Rowe, C. C. Hand, and Geo. Y. Jarvis; Tues. and Thurs. at 5 commencing Sept. 26th. (2-3 cr.)
First semester. Elementary principles and procedures of accounting; discussion and problems. A two hour LABORATORY PERIOD once a week is required for students taking the course for credit unless specially excused by the instructor in which event only two hours credit will be given for the course. The laboratory class will meet on Tuesdays from 6 to 8.

PRINCIPLES OF ACCOUNTING (I) Continuation of the first semester. (2-3 cr.) This course will not be offered until Feb., 1940, unless fifteen students register for the fall semester to begin Sept. 26th. (Tues. and Thurs.)

*SECOND YEAR ACCOUNTING (II)—Dr. Oswald Nielsen; Fri. from 5 to 7:30 commencing Sept. 29th. (3 cr.)
First semester. Valuation, asset values, liabilities and net worth, allocation of income and expense to proper fiscal period as part of problem of valuation, deferring expenses and treatment of unusual losses and gains, profits and dividends and the relationship of funds to reserves.
Prerequisite: First year accounting or equivalent.

*SECOND YEAR ACCOUNTING (II) Continuation of the first semester to be offered in Feb., 1940. (3 cr.)

ACCOUNTING IN THE FIELD OF LEGAL PROBLEMS—(See Social and Legal)

*MATHEMATICS OF FINANCE (II)—Mr. Wm. H. Rowe; Tues. and Thurs. at 5 commencing Sept. 26th. (2-3 cr.)
Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; determination of annual payments necessary to accumulate sinking funds and to amortize debts to installments and preparation of schedules for such accumulations and amortizations. The valuation of bonds in cases where the yield rate differs from the bond rate and the preparation of schedules for the amortization of premiums or accumulations of discounts on such bonds. Computation of depreciation by the sinking fund method, the fixed percentage of book value method, and other methods, as well as the preparation of schedules for the same will be included. Some study will be given to life probabilities, and the computation of premiums for the simpler types of life annuities and life insurance.
This course is given primarily for students of accounting, but others will be admitted. The application to accounting will be reserved until the last third of the semester. For students not taking the accounting applications the course will run for ten weeks with two hours credit; for accounting students the course will continue five additional weeks and give three hours credit. Problems will include those of types given in C.P.A. examinations.
Prerequisites: Algebra; and for students taking the three hour course, one year of accounting. (See also a more advanced course under Mathematics.)

Graduate and Advanced Undergraduate

*AUDITING (IV, V)—Mr. Theodore B. Nickson; Wed. from 5 to 7:30 commencing Sept. 27th. (2 cr.)
The purposes and types of audits will be studied. Consideration will be given to such problems as the planning and performing of audits, principles and auditing of different types of audits, audit working papers and reports, and responsibility of the auditor.

COMMODITY EXCHANGE AUDITING (IV, V)—Mr. John J. Bachmann; Mon. from 5 to 7:30 commencing Sept. 25th. (3 cr.)
Prerequisite: Auditing.

*INCOME TAX LAW AND PROCEDURES (IV)—Mr. Geo. B. Clark. (3 cr.) For further information communicate with the Graduate School Office or American University.
This will be a study of the Federal Income Tax Acts and their administration from the standpoint of tax returns. The several forms used for the income tax returns are analyzed. Detailed study is made of the various kinds of income exemptions and deductions.
Prerequisite: First year accounting or its equivalent.
For additional courses see American University, School of Public Affairs Catalog.

BOTANY
Undergraduate

SYSTEMATIC BOTANY (II)—Dr. S. F. Blake; Mon. and Wed. at 4:50 commencing Sept. 25th. (2 cr.)
This course is intended to give those with no previous experience in systematic botany an acquaintance with the elementary principles of the subject sufficient to enable them to use the ordinary manuals to advantage. The second semester will be devoted to the identification of wild plants of this region by the use of a manual. One or two short field trips will be held.

Graduate and Advanced Undergraduate

HISTORY OF BOTANIC RESEARCH (IV, V)—Dr. O. F. Cook; Tues. and Thurs. at 5 commencing Sept. 26th. (2 cr.)
A general survey of human interest in the plants of the world.

PLANT ECOLOGY (IV, V)—Dr. M. B. Waite; Mon., Wed., and Fri. at 4:50 commencing Sept. 25th. (2 cr.) Each semester to run for ten weeks.
General plant ecology. The ecology of cultivated crop plants will be stressed.
Prerequisites: A general knowledge of botany and of agriculture.

PLANT BREEDING WITH SPECIAL REFERENCE TO DISEASE RESISTANCE (V)—Dr. F. J. Stevenson, assisted by other specialists; Mon. and Wed. at 5 commencing Sept. 25th; Beltsville Horticultural Center. (Offered at two year intervals; not available again until 1942-43.)
Prerequisites: B.S. degree in botany or related subject.

Courses in **LANDSCAPE DESIGN** will be available the second semester.
A course in the **GENERAL SURVEY OF AGRICULTURE** will be given if an available instructor can be obtained. See second semester catalog.

CHEMISTRY
Undergraduate

AN INTRODUCTION TO ORGANIC CHEMISTRY (II)—Dr. E. P. Clark; Tues. and Thurs. at 4:50 commencing Sept. 26th. (2 cr.)
The fundamental principles of general organic chemistry. (For laboratory, see the catalogs of local universities.)

MODERN ORGANIC PLASTICS (II, III)—Dr. Lee T. Smith; Mon. and Wed. at 5 commencing Sept. 27th. (2 cr.)
The general subject matter pertaining to the manufacture and use of modern organic plastics. Specimens of raw materials and fabricated articles will be available for demonstration.
Prerequisite: A year of college chemistry.

Graduate and Advanced Undergraduate

PHYSICAL CHEMISTRY (III)—Dr. Benjamin Makower; Wed. and Fri. at 5 commencing Sept. 27th. (2 cr.)
Classification of matter. Atomic and kinetic theories. Atomic structure. Valence and molecular structure. Solutions. Thermochemistry. The phase rule. Chemical kinetics and thermodynamics. Conduction by electrolytes. Text: Getman and Daniels **Theoretical Chemistry** (John Wiley).
Prerequisites: A year of college chemistry, with laboratory; a year of college physics; calculus.

PHYSIOLOGICAL CHEMISTRY (IV, V)—Dr. Herbert O. Calvery; Tues. and Thurs. from 7:45 to 8:45 a.m. commencing Sept. 26th. (2 cr.) (Another hour to be arranged if morning hour not satisfactory.)
First semester. A lecture course on the elementary principles of biochemistry. The course will deal with the chemistry of the proteins, fats, and carbohydrates; the general chemical composition of animal tissues, e.g., muscle, nerve, milk, and blood; a brief discussion of the enzymes of the gastro-intestinal tract; and finally, the digestion and absorption of the principal foodstuffs.
Prerequisites: One year general chemistry; one year organic.

ADVANCED ORGANIC CHEMISTRY (IV, V)—Dr. W. Gordon Rose; Tues. and Thurs. at 4:50 commencing Sept. 26th. (2 cr.)
In this course fundamental reactions will be reviewed and elaborated. Newer developments in aliphatic chemistry will be presented and recent progress in the chemistry of sterols, vitamins, and sex hormones will be given.
Prerequisites: A year of organic chemistry and a year of physics.

ADVANCED INORGANIC ANALYTICAL CHEMISTRY (IV, V)—Dr. James I. Hoffman; Tues. and Thurs. from 6:30 to 7:30 commencing Sept. 26th. (2 cr.)
During the first semester a study will be made of solvents and fluxes, and the composition, classification, and segregation of materials. This will be followed by a careful study of the general scheme of rock analysis and the application of common and special

reactions in analytical procedures. The work in the second semester will cover colorimetric analysis, organic reagents used in inorganic analyses, and diagrammatic outlines of procedures used in the analysis of selected materials. The evaluation of results and a discussion of probable and reasonable errors will conclude the course.

Prerequisite: A year of general chemistry.

Graduate

CHEMICAL KINETICS (V)—Dr. Stephen Brunauer; to be offered the fall semester of next year, 1940-41.

CATALYSIS (V)—Dr. Stephen Brunauer; to be offered the spring semester of next year, 1940-41.

THERMODYNAMICS (V)—Dr. F. G. Brickwedde; to be offered next year, 1940-41.

INDUSTRIAL ORGANIC SYNTHESIS (V)—Mr. P. H. Groggins; to be offered next year, 1940-41.

BIOCHEMISTRY (V); to be offered in 1941-42.

SEE ALSO SPECIAL LECTURES, ESPECIALLY "HISTORY AND PHILOSOPHY OF SCIENCE."

CLERICAL AND SECRETARIAL
Undergraduate

GOVERNMENT CORRESPONDENCE (II)—Mrs. Mary H. Sanders; Tues. from 5 to 7 commencing Sept. 26th. (2 cr.)
The writing of government letters from the organization of subject matter to the language of the letter, paragraphing, construction of effective sentences, and correct usage. Vocabulary building. Methods for improving expression. Development and application of appraisal standards. Discussion of the problems involved in dictating and reviewing correspondence and supervising letter writers from the standpoint of the stenographer, dictator, reviewer, and supervisor. (This course will be repeated the second semester.)

GOVERNMENT CORRESPONDENCE FOR DICTATORS, REVIEWERS, AND SUPERVISORS (IV)—Mrs. Florence P. Marks; Mon. from 5 to 7 commencing Sept. 25th. (2 cr.)
Designed for those who dictate and review letters or who supervise the preparation of correspondence. The course will cover the development and application of letter appraisal standards, the analysis and revision of problem letters, the organization of subject matter, the technique of dictating, the development and training of letter writers, procedures in making correspondence surveys, the application of check-lists for supervisors, the use and preparation of correspondence manuals. (This course will be repeated the second semester.)

AUDITING PROCEDURE (Government vouchers and related documents) (II)—Mrs. Florence P. Marks; Thurs. from 5 to 7 commencing Sept. 28th. (2 cr.)
This course covers the audit of standardized government vouchers, travel authority, formal contracts, informal agreements, purchase orders, tax exemption certificates, bills of lading, etc. (This course will be repeated the second semester.)

SECRETARIAL TRAINING—Mrs. Alice Coffman; Fri. from 5 to 7 commencing Sept. 29th.
Designed for those secretaries and stenographers who desire to develop their abilities and knowledge to enable them to become competent government secretaries.

The course will embrace instruction in proper office decorum, sufficient practice to assist the secretarial student in solving definite secretarial problems, training to broaden knowledge and appreciation of government procedure and practices, and development and perfection of the student's ability as a shorthand writer and secretary.

Prerequisite: Minimum CAF-2 grade and ability to write at least 96 words per minute.

FILING AND CLASSIFICATION SEMINAR. The non-credit Filing and Classification Seminar which has been heretofore conducted, will be discontinued as a Graduate School project in view of the fact that it is hoped to organize work of this type as an in-service training project.

We are considering the formation of a credit class in the second semester for going more thoroughly into the questions of filing and classification.

Prospective students should communicate with Mr. John S. Lucas of the Office of Plant Operations of the Department of Agriculture, branch 5635.

SHORTHAND AND STENOTYPY DEVELOPMENT

70 to 110 WORDS PER MINUTE—Mrs. Alice Coffman; Mon. and Wed. at 5 commencing Sept. 25th.
This course is designed for those who desire a review of theory in Gregg Shorthand with dictation from 70 to 110 words per

minute. Special attention will be given to the acquisition of a large vocabulary of Gregg outlines. Dictation will be graded from business letters and the Congressional Record; legal and technical matter relevant to the work in government offices.

Class will be limited to 25 members.

100 to 150 WORDS PER MINUTE—Miss Clara E. Richter; Mon. and Wed. at 5 commencing Oct. 2d.

This course is designed to develop recording speed in the more technical vocabularies. Subject matter will be selected and graded from the publications of the various bureaus in which members of the class are employed. Students must thoroughly familiarize themselves with the basic theory of the system of shorthand that they write prior to entering the class.

130 to 175 WORDS PER MINUTE—Miss Clara E. Richter; Mon. and Wed. at 6 commencing Oct. 2d.

Continuation of 100 to 150 word class with special emphasis on reporting technique.

175 WORDS PER MINUTE AND UP—Miss Clara E. Richter; Tues. and Thurs. at 5 commencing Oct. 3d.

STENOTYPY—Mrs. C. W. A. Draper; Tues. and Thurs. commencing Sept. 26th.

Graduated classes in dictation for junior and senior stenographers.

STENOTYPY—Mrs. C. W. A. Draper; Mon. and Wed. commencing Sept. 25th.

Graduated classes in dictation for junior and senior reporters.

(Fee—$12.00 for sixty hours.) For schedule of classes call for special circular.

INTERNATIONAL SHORTHAND—Mr. Fred Neter; Fri. from 5 to 7 commencing Sept. 29th.

For beginners and advanced students who are interested in taking up shorthand in German, French, Dutch, Spanish, and Italian. Persons not familiar with the respective languages may obtain preparatory training.

REPORTING IN SPANISH—Miss Grace Bauer; Mon. and Wed. at 5 commencing Oct. 2d.

Study of manual and supplemental dictation, including articles and business correspondence. (Gregg system used.)

Prerequisite: Knowledge of Spanish.

ECONOMICS

For prerequisites in these courses consult the instructor or the director.

Undergraduate

1. PRINCIPLES OF ECONOMICS (II)—Dr. E. W. Braun; Mon. and Wed. at 5 commencing Sept. 25th. (2-3 cr.)

This course is designed to serve students who wish a foundation for advanced economic theory, and students who wish to link quantitative analysis with economic principles.

2. *SOCIAL AND ECONOMIC HISTORY OF AMERICAN AGRICULTURE (III)—Mr. Everett E. Edwards; Tues. and Thurs. at 5 commencing Sept. 26th. (2-3 cr.)

First semester. Geographic factors; settlement of the English colonies along the Atlantic Coast; indigenous and foreign contributions to American agriculture; Indian agriculture and Indian influence on agrarian immigration, English agricultural practices, French influences, Spanish contributions; land systems and tenures in the English colonies; policies concerning the public domain, 1776-1862; agrarian settlement in America from the American Revolution to the American Civil War; agriculture during the same period; transportation facilities and home and foreign markets; farmers and political activity to the American Civil War; agriculture's relation to the sectional struggle.

Second semester. Continuation of the first semester. (2-3 cr.) No prerequisites.

3. *CONTEMPORARY ECONOMIC PROBLEMS (III)—Dr. Max J. Wasserman; Tues. and Thurs. at 5 commencing Sept. 26th. (2 cr.)

The object of this course is to analyze in some detail the various types of economic policies which are now being used or have been proposed for giving direction and plan to modern economic organization.

Graduate and Undergraduate

4. HISTORY OF ECONOMIC THOUGHT (IV)—Dr. Max J. Wasserman; Mon. and Wed. at 5 commencing Sept. 25th. (2 cr.)

An examination of the principal economic theories from Greek antiquity to the present time in the light of the institutions, customs and practices which conditioned them.

Prerequisites: Major in social sciences, or the consent of the instructor.

5. *ECONOMIC THEORY (IV)—Mr. Howard S. Piquet. (See American University, School of Public Affairs catalog.)

6. *AGRICULTURAL PROGRAM PLANNING (IV)—Dr. Bushrod W. Allin and Mr. D. A. FitzGerald; Tues. and Thurs. at 5 commencing Sept. 26th. (3 cr.)

An analysis of the origins and accomplishments of agricultural program planning as now being conducted cooperatively by the U. S. Department of Agriculture and the Land-Grant Colleges, with special emphasis on the philosophy back of the work, the procedures by which it is being carried out, and methods being developed for translating planning into action.

7. *REGIONAL AND LOCAL PLANNING (IV)—Mr. Bushrod W. Allin and associates; Tues. and Thurs. at 5 commencing Feb. 1940. (3 cr.)

8. *GEOGRAPHY AND NATURAL RESOURCES (IV)—Mr. Rudolf S. Clemen. (See A. U., School of Public Affairs catalog.) (3 cr.)

9. *AGRICULTURAL ECONOMICS (IV)—Drs. O. C. Stine and F. L. Thomsen. (See A. U. catalog.) (3 cr.)

10. *POPULATION PROSPECTS (IV)—Dr. Frank Lorimer. (See A. U. catalog.) (3 cr.)

11. *STATE AND POPULATION (IV)—Dr. Frank Lorimer. (See A. U. catalog.) (3 cr.)

12. *WATER RESOURCES (IV)—Mr. G. F. White. (See A. U. catalog.) (1½ cr.)

13. *FORESTRY ECONOMICS AND FINANCE (IV)—Instructor to be announced. (1½ cr.) Call office for further details.

14. *FOREST POLICY (IV)—Instructor to be announced. (1½ cr.) Call office for further details.

15. *CURRENT SOCIAL LEGISLATION (IV, V)—Mr. Glen Leet; Tues. from 7:30 to 10 p.m. commencing Sept. 26th. (3 cr.)

The field covered will include social legislation currently under Congressional consideration and will include social security, old age insurance, unemployment compensation, public assistance, health insurance, child welfare, unemployment and relief, public health, child and maternal health, venereal disease control, cancer control.

This course will be conducted on a seminar basis with a limited enrollment. There will be occasional guests present with special knowledge of particular problems considered. Reports of hearings before Congressional committees and reports of executive agencies will be used extensively as source material.

16. *GOVERNMENT CONTROL OF ECONOMIC LIFE (IV)—Mr. Rudolf S. Clemen. (See A. U. catalog.) (3 cr.)

17. *COTTON MARKETING (IV)—Dr. John W. Wright and specialists in various phases of cotton marketing; Mon. and Wed. from 5 to 6:15 commencing Sept. 25th. (2-3 cr.)

This course is designed to provide a well-rounded picture of the marketing system for raw cotton as well as a broad background of information relative to the manufacturing, uses, and distributive process for cotton goods, particularly for those engaged in research or service activities that have to do with this commodity. Although primary emphasis will be placed on the market mechanism for raw cotton and its functioning through all stages of the distributive process from sale by producers to purchase by spinners and the problems incident thereto, the course will cover also the manufacturing processes and the organization of the cotton textile industry, the system of distribution of manufactured cotton goods and the general situation with respect to cotton in the present world economy.

Students taking the course for graduate credit will be held for appropriate prerequisites and will be expected to do additional work.

17½. COTTON CLASSING (I, II)—Mr. R. L. Kause, in cooperation with the Cotton Division, Bureau of Agricultural Economics; a ten weeks' course held in the Cotton Division Laboratory on the sixth floor of the Annex Building, 12th and C Sts., S. W., from 4:30 to 5 daily and 1:30 to 3:30 on Saturdays, with permission to substitute the 8:30 to 9 a.m. period daily; commences April 1st. (2 cr.)

A study of grade, color, staple, and preparation. Registration limited to fifteen.

18. *ECONOMICS OF AGRICULTURE PRODUCTION (IV)—Drs. Sherman E. Johnson and O. E. Goodsell. (2 cr.) To be offered the fall semester of 1940-41.

18½. *FARM MANAGEMENT (IV)—Drs. Sherman E. Johnson and O. E. Goodsell. (2 cr.) To be offered the spring semester of 1940-41.

19. *FOREIGN TRADE PROBLEMS AND POLICIES IN RELATION TO AGRICULTURE (IV)—Mr. L. A. Wheeler. To be offered in 1940-41. (2 cr.)

20. **AGRICULTURAL PRICES (IV)—Dr. F. L. Thomsen. To be offered the fall semester of 1940-41. (3 cr.)**

21. ***AGRICULTURAL PRICE ANALYSIS (IV)—Dr. F. L. Thomsen. To be offered the spring semester of 1940-41. (3 cr.)**

22. ***PRODUCTION ECONOMICS (IV)—Instructor to be announced. To be offered the fall semester of 1940-41. (3 cr.)**

Graduate

23. ***THEORY AND PRINCIPLES OF AGRICULTURAL MARKETING (V)—Dr. F. V. Waugh, Mr. R. O. Been, and Dr. A. C. Hoffman; Wed. from 5 to 6:40 commencing Sept. 27th. (2 cr.)**
Emphasis of the course will be on the application of economic theory to marketing problems.

Prerequisites: At least one course in general economic theory; also a course in marketing or a year's experience in research, teaching, or regulatory work in marketing will be required. It is desirable that all students have at least a good working knowledge of ordinary algebra and that they be familiar with methods of graphic analysis.

24. ***CONTEMPORARY ECONOMIC THOUGHT (V)—Mr. Howard S. Piquet. (See A. U. catalog.) (3 cr.)**

25. ***LAND PROBLEMS AND POLICIES (V)—Dr. Lewis C. Gray. (See A. U. catalog.) (3 cr.)**

26. ***IMPACT OF CONDITIONS IN INDUSTRY ON AGRICULTURE (V)—Dr. Mordecai Ezekiel, assisted by visiting experts; Mon. from 7:30 to 10 commencing Sept. 25th. (3 cr.)**
A seminar course in which class discussions will be interspersed with addresses by experts in each field of industry. (Registration limited to 25.) Students with practical experience in dealing with farmers, labor problems, or industrial problems first hand are especially desired to give concreteness to the discussions.

27. ***SUBSISTENCE FARMING (V)—Dr. M. L. Wilson. To be offered in the second semester; Tues. from 5 to 7:30. (2 cr.)**
Prerequisites: General basic knowledge of agriculture and permission of instructor.)

28. ***BUSINESS CYCLES (V)—Dr. Fritz Mann. (See A. U. catalog.)**

28½. ***IMPERFECT COMPETITION (V)—Dr. Loyle A. Morrison. 2d semester only. (3 cr.) (See A. U. catalog.)**

29. ***INTERNAL MIGRATION (V)—Dr. Frank Lorimer. (See A. U. catalog.) (2 cr.)**

30. ***ECONOMIC COORDINATION (V)—Dr. Gardner C. Means. (See A. U. catalog.) (3 cr.)**

31. ***ECONOMICS OF INSTABILITY (V)—Dr. Mordecai Ezekiel and Mr. Louis H. Bean. To be offered the fall semester of 1940-41. (3 cr.)**

32. ***INSTITUTIONAL ECONOMICS (V)—Dr. Elmer W. Braun. To be offered the fall semester of 1940-41. (3 cr.)**

33. ***FUTURE TRADING IN AGRICULTURAL COMMODITIES (IV)—Mr. Blair Stewart; Fri. from 7:30 to 9:10 p. m., commencing Sept. 29th. (2 cr.)**
The purpose of this course is to provide an understanding of the operation and functions of futures markets for agricultural commodities. The nature of the futures contract, the types of traders, trading procedure, accounting and clearing techniques, hedging, and arbitrage are studied. Attention is also given to the delivery process, to manipulation, to the factors determining futures prices including the relations between futures prices and spot prices, and to price spreads between futures and between markets. The functions of the futures markets in the economic system are considered and the problems of government regulation and control. Admission by consent of instructor.

EDITING
Graduate and Undergraduate

EDITING MANUSCRIPTS ON AGRICULTURE, HOME MAKING, AND RELATED SUBJECTS (IV, V)—Dr. M. C. Merrill, and the editorial, printing, and indexing staffs in the Division of Publications, Office of Information; Mon. and Wed. from 5 to 6:30 commencing Sept. 25th. (3 cr.) Registration is limited to 40 students.
This course is intended primarily for those seeking information on the editorial technique involved in handling manuscripts after

they leave the author's hands and until they are issued in printed form. Discussion of the fundamental principles of editing, including the organization or rearrangement of material for effective presentation; rhetorical style in relation to subject matter; sentence structure and effective use of English; paragraphing and leads; consideration governing titles, tables of contents, headings, footnotes, illustrations, literature citations and bibliographies, and statistical checking; the principles of table formation and arrangement; typography and the relation of type to subject matter; and the fundamentals of indexing and proofreading. Practical examples of editorial work will be discussed in class. Opportunity for some familiarity with the Style Manual of the Government Printing Office will be provided. Collateral reading will be indicated. Those desiring credit for the course will be required to pass a written examination at the end of the semester.

ENGLISH
Undergraduate

COMPOSITION AND RHETORIC (I)—Dr. Susan E. Harman; Thurs. from 5 to 7 commencing Sept. 28th. (2 cr.)
First quarter freshman English. An introductory course in writing and English usage, designed especially for those who need a course preparatory to the more advanced English courses. Special attention will be given to the fundamental principles and mechanics of good writing: Grammar, punctuation, spelling, etc.

VOCABULARY BUILDING AND DICTIONARY STUDY (I)—Mrs. Sallie M. Pease; Tues. from 5 to 7 commencing Sept. 26th. (2 cr.)

Graduate and Advanced Undergraduate

DESCRIPTIVE ENGLISH GRAMMAR (III, IV)—Dr. Susan E. Harman; Mon. from 5 to 7 commencing Oct. 2d. (2 cr.)
A course in grammatical principles, stressing sentence structure and correct English form. Students are required to analyze sentences by diagram and to correct examples of bad English.

APPLIED ENGLISH GRAMMAR (III, IV)—Dr. Susan E. Harman; Wed. from 5 to 6 commencing Feb. 1940. (1 cr.)
Application of the principles of grammar in practical writing. Open only to students who have had the course in English grammar.

ENGLISH LITERATURE AND DRAMA
Graduate and Advanced Undergraduate

ENGLISH LITERATURE SINCE 1800 (IV, V)—Mr. Albert S. Kerr; Tues. and Thurs. at 4:50 commencing Sept. 26th. (2 cr.)
A rapid survey of the main currents in English literature since the Romantic Movement, both poetry and prose.

THE ENGLISH NOVEL (IV, V)—Mr. Albert S. Kerr; Mon. and Wed. at 4:50 commencing Sept. 25th. (2 cr.)
Beginning with the late Victorians, the course will treat developments during the last sixty years, particularly the extension of the realistic method under the influence of continental writers and the new psychology. The course will consist of lectures and discussions, with a rapid reading of numerous novels. Text recommended: Pelham Edgar, **The Art of the Novel,** College Edition, (Macmillan, 1933).

RURAL NOVEL (IV, V)—Miss Caroline B. Sherman; Fri. from 5 to 7 commencing Feb. 1940. (2 cr.)
Reading and discussion chiefly, with occasional lectures. Review of the development of rural fiction in America.

PLAY WRITING AND PLAY PRODUCTION (IV, V)—Miss Rebecca Dial; Tues. and Fri. at 5 commencing Sept. 29th. (2 cr.)

MUSIC AND LITERATURE APPRECIATION (IV)—Miss Cecile Willink; Thurs. from 5 to 7 commencing Oct. 5th. (2 cr.)
Various forms of musical composition will be studied, including the folk-song, opera, fugue, sonata, symphonic poem and symphony, illustrated by Victrola records, together with a brief history of the lives and works of the masters of music. A technical knowledge of music is not required of the student.

Poetry is the form of literature most largely studied in the course because of its definiteness of thought, clarity of exposition, and forcefulness of expression. The approach will be through precis-writing, or analysis and synthesis. In developing the ability to grasp an author's thought and express it clearly and concisely, the student acquires a mental habit which is useful in all fields.

SELECTIONS FROM WORLD LITERATURE (III, IV)—Dr. C. H. McReynolds; Fri. from 5 to 7:30 commencing Sept. 29th. (3 cr.)
Selections from the best literature of various ages and countries are read and discussed. The course consists of study, analysis, and appreciation of ideas and artistic conceptions as set forth by the greatest geniuses of all time—their philosophy of life and its significance to life today. Among the writers included are Tolstoy, Boccaccio, Dante, Voltaire, Socrates, Plato, Mohammed, Aristotle,

Machiavelli, Cervantes, Hugo, Homer, Ovid, Nietzsche, Budda, Rousseau, Goethe, Ibsen, Vergil, Chekhov, Moliere, Horace, Petrarch, and others. (English and American literature not included.)

DEVELOPMENT OF WORLD DRAMA (III)—Dr. C. H. McReynolds; Tues. from 5 to 7 commencing Sept. 26th. (2 cr.)
Beginning with Greece, the course treats the development of drama as revealed in plays of the various countries—Italy, Spain, France, Germany, Russia, Holland, and America (England not included). The course will be conducted in lectures and discussions, with the reading of a number of plays.

ENGINEERING
Graduate and Advanced Undergraduate

ANALYTICAL MECHANICS (IV, V)—Dr. F. G. Brickwedde; Tues. and Thurs. at 5 commencing Sept. 28th. (2 cr.) (For description of course see Mathematics 21, 22.)

RADIO ENGINEERING (IV, V)—Dr. Lynde P. Wheeler; Thurs. from 5 to 7 commencing Sept. 28th. (2 cr.)
The theory of the vacuum tube and its use as amplifier, oscillator, and detector, and a discussion of other problems relating to transmission and reception of radio signals. Emphasis will be placed on the mathematical processes useful for the solution of radio problems.

GEOGRAPHY
Graduate and Advanced Undergraduate

*INTRODUCTION TO METHODS OF QUANTITATIVE GEOGRAPHY (IV, V)—Dr. John Kerr Rose; Tues. from 5 to 7 commencing Sept. 26th. (2 cr.)
Several important sections of the field of geography will be surveyed, including population distribution, agricultural geography, land utilization, and climatology. The general approach will be that of the recognition and definition of problems that can be studied by quantitative techniques; survey of quantitative contributions that have been made thereto. Specific application and utility of descriptive statistics, correlations, and sampling techniques. Areal indices and measures of association applied to data having spatial distribution.

Although an acquaintance with the field of geography and a working knowledge of statistics are both highly desirable for the prospective student, the statistical techniques used will be introduced and taught as needed.

GRAPHIC PRESENTATION
Undergraduate

These subjects have a three-fold purpose: First, training in graphic expression; second, developing draftsmen as designers and supervisors in the architectural and mechanical fields; third, training in the reading of blueprints and specifications. The cost per course will be $20 a semester except as otherwise stated. Prerequisites: 15 standard high school units or equivalent.

FREEHAND DRAWING AND SKETCHING (III, IV)—Instructor to be announced; Mon. and Wed. from 5 to 7 commencing Sept. 25th. Fee $15. (2 cr.)
Shades and shadows, theory and harmony of color, composition; outdoor sketching in color the last half of the semester.
Sketching only, two hours a week without credit, on Mondays from 5 to 7; fee $10.

ARCHITECTURAL DRAWING (II, III)—Mr. G. L. Edick; Tues. and Thurs. from 7 to 9 p.m. commencing Sept. 26th. (2 cr.)
Elementary: Geometrical problems, orthographic projections, lettering, architectural symbols. Advanced: Residence design, working drawings, details of construction, studies of modern methods of framing, and use of building materials.

MECHANICAL DRAWING (II, III)—Mr. G. L. Edick; Tues. and Thurs. from 7 to 9 p.m. commencing Sept. 26th. (2 cr.)
Elementary: Geometrical problems, orthographic projections, intersections and developments, lettering, and study of material symbols. Advanced: Studies in machine shop practice, assembly and detail drawings, scale detail drawings from measured sketches by the student.

BLUEPRINT READING (III, IV)—Mr. G. L. Edick; Tues. and Thurs. from 7 to 9 p.m. commencing Sept. 26th. (2 cr.)
The interpretation of standard symbols; dimensioning. Simple problems in orthographic projection requiring a small amount of drawing. The study of projection planes and sections. Some study of details of construction and plans.

VISUAL INFORMATION (III, IV)—Mr. Paul Bissell; Fri. from 5 to 7 commencing Sept. 29th. (2 cr.) Fee $12.00.
This course is designed to aid the information specialist in presenting his information to the public in the most forceful visual

form consistent with the restrictions imposed by the practical necessities of the problem. It will include talks on proven methods used in determining the best mediums through which to reach the public with specified information. The entire problem will be approached from a presentation angle rather than from a subject matter or policy viewpoint.

While the course is not primarily for artists, instruction and criticism will be given on layout, lettering, posters, poster design, and commercial art illustration. A non-technical discussion of the various processes of reproduction and printing will be included. The advantages and limitations of the methods will be studied as well as the variance in costs.

It will be the effort and aim of this course to attempt to show the information specialist methods of preparing "roughs," or "dummies," so that, though lacking artistic ability himself, he may be able to express his ideas in such visual form as to assure a satisfactory finished product from the workman, artist, engraver, or printer.

GRAPHIC CORRELATION (See statistics).

GRAPHIC METHODS APPLIED TO RESEARCH ANALYSIS (See statistics).

HISTORY
Graduate and Advanced Undergraduate

FAMOUS WOMEN OF HISTORY—Miss Mary Sabarth; Mon. from 5 to 6 commencing Oct. 9th. Fee $6.00.

HISTORY OF ART (III)—Dr. Fritz Marti; Mon. from 5 to 7 commencing Sept. 25th. (2 cr.)
First semester. Occidental art from the Renaissance to the present. **Second semester.** Figurative art to development of style. Third century to the Renaissance.
One hour lectures; one hour slide study.

RECENT HISTORY OF THE UNITED STATES (III, IV)—Dr. W. M. Gewehr; Fri. from 5 to 7 commencing Sept. 29th. (2-3 cr.)
The aim of this course is to study the history of the United States since about 1890 with a view to affording a historical approach to our problems of today.

SURVEY OF LATIN AMERICA (IV, V)—Dr. Ernesto Galarza; Fri. from 5 to 7 commencing Sept. 29th. (2 cr.)
The significant aspects of inter-American relations today and their relation to historical forces: Geographic, economic, commercial, racial, military.

LANGUAGES

The standard university language course is three semester hours, each class of fifty minutes. The courses now given for two semester credits meet twice weekly for sixty minute periods. The standard requirements (3 cr.) may therefore be met by an additional thirty minutes a week. Those desiring the three semester credits in courses marked "2-3 cr." must register for them in advance, paying $18 a semester instead of $12.

Courses marked I, II are undergraduate, those marked III, IV, are advanced undergraduate or graduate.

CONVERSATIONAL SEMINARS IN FRENCH AND GERMAN (III)— Miss Mary Sabarth; Tues. and Thurs. at 5 commencing Oct. 10th. (2 cr.) Groups limited to 15.
These seminars are designed to give facility in conversation, use of idiom and correct pronunciation, development of vocabulary in social and business contacts. (Miss Sabarth has had many years of residence and teaching experience in foreign countries and in America, especially at Roberts College in Constantinople, schools in Berlin, and at Barnard College of Columbia.) Advanced classes may be organized if desired. German and French classes will be on separate days; time to be arranged.
Prerequisites: A good reading knowledge of French and German.
CLASS 1. Prerequisite: One year French and German.
CLASS 2. Prerequisite: Two years French and German.
CLASS 3. Prerequisite: Three years French and German.
CLASS 4. Prerequisite: Four years French and German.

*ELEMENTARY SCIENTIFIC FRENCH (I, II)—Dr. Harry B. Humphrey; Mon. and Wed. at 4:50 commencing Sept. 25th. (2-3 cr.)
Instruction in elements of French grammar. Reading and translation of elementary articles from selected scientific texts. This course is designed to prepare beginners for the advanced course in Scientific French.

*ADVANCED SCIENTIFIC FRENCH (III, IV)—Dr. Harry B. Humphrey; Tues. and Thurs. at 4:50 commencing Sept. 26th. (2-3 cr.)

*ELEMENTARY GERMAN (I, II)—Dr. C. H. Leineweber; Mon. from 5 to 7:30 commencing Sept. 25th. (2-3 cr.)

*ADVANCED AND TECHNICAL GERMAN (III)—Dr. C. H. Leineweber; Fri. from 5 to 7:30 commencing Sept. 29th. (2-3 cr.)

ELEMENTARY RUSSIAN (I, II)—Dr. C. H. Leineweber; Wed. from 5 to 7:30 commencing Sept. 27th. (2-3 cr.)

LECTURES ON RUSSIAN LITERATURE (III)—Dr. C. H. Leineweber; Thurs. from 5 to 6 commencing Sept. 28th. (1 cr.) Fee $6.
These lectures will cover the lives and works of the most important writers in Russian literature and will be delivered in English. No knowledge of Russian required.

GERMAN TRANSLATION (III, IV)—Mr. Ira T. Braunstein; Wed. from 5 to 6:30 commencing Sept. 27th. (1½ cr.) Fee $9.
Prerequisites: German grammar and reading knowledge of German.

*BEGINNING SPANISH (I)—Miss Ruberta M. Olds; Mon. from 5 to 7:30 commencing Sept. 25th. (2-3 cr.)
The aim of this course is to secure accuracy and facility in the use of the language by means of drill in pronunciation, conversation, grammar and reading. Texts—a good basic grammar, a reader called A México por Automóvil, and maps of Spanish-American countries.

*SPANISH CONVERSATION AND COMPOSITION (II, III)—Miss Ruberta M. Olds; Wed. from 5 to 7:30 commencing Sept. 27th. (2-3 cr.)
The aim of this course will be to develop ability to understand and to converse in simple idiomatic Spanish, to translate articles in newspapers and magazines, and to compose and translate ordinary business and social letters, and to read for enjoyment.
Prerequisites: Beginning Spanish or its equivalent.

*ELEMENTARY ITALIAN (I, II)—Dr. Nicholas G. Barbella; Tues. from 5 to 7:30 commencing Sept. 26th. (2-3 cr.)
The fundamentals of the language, with practice in conversation. Texts: Joseph L. Russo, **Elementary Italian Grammar;** Marro, **Contemporary Italian Short Stories.**

MATHEMATICAL PREPARATION FOR STATISTICS
Undergraduate

The instructor or Dr. Deming should be consulted by any persons who are in doubt about their preparation and fulfillment of prerequisites.

*1. ALGEBRA (I)—Mr. Harry J. Winslow; Tues. and Thurs., 4:45 to 6:30 commencing Sept. 26th, 1st sem. only. Offered next year. (3 cr.)
The fundamental rules of algebra; exponents; logarithms; proportion, manipulation with proportions; identities and conditions; solution of equations; binomial theorem, numerical approximations. Uses of symbols of operations. Determinants; solution of equations by the reciprocal matrix. Theory of equations. Progressions; series. Permutations and combinations. Graphical methods will be illustrated throughout the course.
Prerequisite: High school algebra, plane and solid geometry.

*2. TRIGONOMETRY AND ANALYTIC GEOMETRY (I)—Mr. Harry J. Winslow; Tues. and Thurs., 4:45 to 6:30. 2d semester only. Offered every year. (3 cr.)
Definitions in trigonometry; identities; complex numbers; DeMoivre's theorem; trigonometric equations. The study of analytic geometry will include the line, conic sections, and some other plane curves, polar coordinates, families of curves with one or more parameters. Parametric equations of curves. Radical axis; graphic solution of equations. Some three-dimensional geometry.
Prerequisite: Mathematics I or its equivalent.

*3, 4. CALCULUS (II)—Dr. W. Edwards Deming; Mon. and Fri., 4:45 to 6:30 with a few minutes intermission, commencing Oct. 2d. Offered this and alternate years. (3 cr.)
First semester. Variables, functions, limits, continuity, divided differences, derivatives. Application of the derivative to geometry, physics, curve fitting, and analysis. Mean value theorem. The antiderivative. Riemann integration. (3 cr.)
Second semester. Standard integral forms. Partial and total derivatives. Constrained maxima and minima in functions of two variables. Lagrange multipliers. Interpolation. Taylor's series with one or more independent variable. Propagation of errors. Operations with series. Multiple integrals. Line integrals. Approximate integration; the Euler-Maclaurin formula; mechanical integration. Function scales. History and application stressed. Text: Morris & Brown **Calculus** (McGraw-Hill, 1937). (3 cr.)
Prerequisite: Mathematics 1 and 2.

*5. HIGHER ALGEBRA (III)—Dr. E. J. Finan (Catholic University); Wed. and Fri., 4:45 to 6:15, commencing Sept. 29th, fall semester only, this and alternate years. (3 cr.)
Miscellaneous equations; proportion and manipulation; mathematical induction, multinomial theorem; inequalities; undetermined coefficients; determinants, theory of equations, some matrix algebra;

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root-squaring processes. History. The student will have an opportunity to learn something about mathematical rigor. Text: Hall and Knight **Higher Algebra** (Macmillan).

Prerequisite: Two semesters of college mathematics (courses 1 and 2).

*6. COORDINATE GEOMETRY AND VECTORS (III)—Dr. S. B. Littauer (Naval Academy); Tuesdays from 5 to 7; spring semester only, this and alternate years. (2 cr.)
Lines, planes, conics, quadric surfaces. Tangents, normals, transformations, invariants. Determinants will be used freely. Problems in multiple correlation and curve fitting, and the near indeterminancy of linear equations, will be examined geometrically. The vector notation will be studied, and many of the equations involving tangents and normals will be compressed by vector notation.

Prerequisites: Mathematics 1, 2, 3, 4.

Graduate and Advanced Undergraduate

*8. THE CALCULUS OF FINITE DIFFERENCES (V)—Dr. W. Edwards Deming; offered every four years; not given until 1942-43.

*9. MATHEMATICS OF INVESTMENT (IV, V)—Messrs. Eugene Rasor and Dorrance C. Bronson, F.A.S. Not offered this year.

*11, 12. ADVANCED CALCULUS (IV, V)—Offered in alternate years, due in 1940-41.

13, 14. DIFFERENTIAL EQUATIONS (IV, V)—To be offered in 1941-42, or earlier if the demand is sufficient.

*15, 16. LINEAR ALGEBRA (V)—Mr. M. A. Girshick. Offered every third year, due 1941-42.

*17, 18. THEORY OF INFINITE PROCESSES (V)—Dr. C. Winston (Railroad Retirement Board), Tuesday evenings from 8 to 10 commencing Oct. 2d; this and every third year. (2 cr.)
Infinite aggregates, convergent and divergent sequences. Theory of the real variable. Differentiation; Riemann and Lebesgue integration. Power series, expansion of functions, series with variable terms, transformation and reversion of series. Continued fractions. Infinite determinants. History and applications.

Prerequisites: Mathematics 11 and 12; Mathematics 5 also advised.

*19, 20. THEORY OF FUNCTIONS (V)—Mr. M. A. Girshick. To be offered next year, 1940-41.

21, 22. ANALYTICAL MECHANICS (IV, V)—Dr. F. G. Brickwedde (National Bureau of Standards); Tues. and Thurs. at 5 commencing Sept. 28th. (2 cr.)
The course begins with some lessons in vector algebra, after which the study of statistics and dynamics is taken up in vector notation, with practice in translating the equations into Cartesian and other coordinates. Fundamental principles, general problems such as vibrations of damped systems, the gyroscope, wave motion, some potential theory relativity dynamics, and topics of special interest to the class. The equations of Lagrange and Hamilton will be included. Similarities with thermodynamics and electricity will be pointed out. Text: Ames and Murnaghan **Theoretical Mechanics** (Ginn).

Prerequisites: Mathematics 3 and 4; college physics and a first course in statistics and dynamics.

23, 24. HISTORY OF MATHEMATICS (V)—Professor Tobias Dantzig. To be offered 1940-41.

Other mathematical courses are listed under statistics on the following pages.

STATISTICS
Undergraduate

SEMINARS WITH JEFFREYS. Dr. Harold Jeffreys of Cambridge will be in Washington the first half of September, and he has consented to talk informally at several seminars on the subject of probability. All persons interested are invited. Dates have not been arranged, but information will be available about September 5th.

LECTURES BY WISHART. Dr. John Wishart of Cambridge will be here the second week in January to deliver a series of three lectures. Particulars regarding the arrangements will be available later, and will be mailed to any person interested upon application.

The Graduate School plans to bring annually to Washington one or two leaders in statistical thought. In the past R. A. Fisher, J. Neyman, John Wishart, Frank Yates, and Walter A. Shewhart have given courses of lectures here with informal seminars, some of which are available in print (see the list of publications at the back).

Most if not all problems of inference from data in agriculture are not and can not be made purely statistical, but must involve close attention to the scientific aspects. There is no such thing as being trained in statistics without being trained also in some branch of science and in philosophy. In conjunction with the courses in statistics, the student is earnestly urged to pursue studies in these lines of thought; such work constitutes an intangible prerequisite to progress in statistical inference. Moreover, any course, statistical or otherwise, necessarily receives its character from the instructor, wherefore students planning to undertake work in statistics are advised to look forward to a well-rounded program, not to be curtailed until a number of points of view have been acquired. Mathematics in various degrees, both as a tool and as a mode of thought, is indispensable to studies in statistics (and it is a rule that students working for credit in any course must come prepared with the stated mathematical prerequisites). Dr. Woods, Dr. Deming, and members of the staff will be glad to assist students in drawing up programs of study.

SEMINARS IN STATISTICS—1st and 3d Mondays of each month at 8:15 p.m. Membership is limited to people who can contribute original work or a survey of journal articles. This is not a credit course. Fee 50 cents per semester. Applications should be sent in writing to the Director.

*1, 2. GRAPHIC METHODS APPLIED TO RESEARCH ANALYSIS (I)— Mr. R. G. Hainsworth; Tues. and Thurs. from 5 to 7 commencing Sept. 26th. Fee $15.00. (2 cr.)
First semester. Charts and diagrams; general discussion of the major groups and the breakdown into their various classes, forms and types. General chart interpretation. Actual working examples of time series, frequency, and other forms of illustrations. Applications of the pictorial aspect to charting. Prevailing and suggestive examples of chart standardization and preparation of data for graphic presentation.
Second semester. Maps: How to interpret them; when and how to use them; their preparation and adaptability; examples of data as applied to statistical and geographical maps. Actual working examples of multiple dot, circle, pie diagram, cross hatch, line, basic outline, and typographic and physiographic types will be given.

3. INTRODUCTION TO STATISTICAL ANALYSIS. There will be four different sections in this course, varying with the purpose and prerequisites.
Section a (grade I)—Dr. O. A. Pope; Mon. and Wed. at 4:45 commencing Nov. 16th, and ending in March (2 cr.). An additional seminar will be held Thursdays at 3 o'clock for consideration of special research problems; this seminar is optional, giving one additional credit to those who complete the assignments. The course is for students of the plant and animal sciences who wish an introduction to certain of the newer experimental designs and the proper analyses. It is non-mathematical and is designed particularly as a forerunner to Dr. Brandt's course (no. 7). The topics are: Randomized blocks, Latin squares, factorial designs, and pseudo-factorial designs. There are no mathematical prerequisites.

Section b (grade I)—Mr. A. Mason DuPré; Mon. and Wed. at 4:45 commencing Sept. 25th. (2 cr.) Fall semester only. This is a non-mathematical elementary course designed for statistical clerks who wish to become familiar with the more common statistical terms and formulas, and who wish to learn how to lay out the forms for machine calculations. Routine and methods of checking calculations will be emphasized. The course will include the presentation of data and the results of calculations in tables and charts. No prerequisites. Text: A. E. Waugh **Elements of Statistical Method,** and **Laboratory Manual** (McGraw-Hill, 1938). See note 1.

Section c (grade II)—Mr. B. R. Stauber and Dr. Solomon Kullback; Tues. and Thurs. at 4:45 commencing Sept. 25th (2 cr.) Designed for students of business and economics. Topics: The collecting of economic and census data; the presentation of data in tables and graphs; different kinds of averages; measures and significances of dispersion; elementary principles of sampling; introduction to index numbers and time series. Attention will be paid to preparing formulas for machine calculations.
Prerequisites: Mathematics 1 and 2. See notes 1 and 2 below.

Section d (grade III)—Mr. Sidney Wilcox; Mon. and Wed. at 5 commencing Sept. 27th (2 cr.). The topics and purpose will be the same as those of section c, but will place more emphasis on the derivation and meaning of the processes employed. This section will accommodate students who have had some previous work in statistics, or who have had mathematical training in excess of the prerequisites, Mathematics 1 and 2. See notes 1 and 2 below.

Note 1. There is necessarily a considerable amount of calculation in the work of sections b, c, and d. Students who do not have access to a calculating machine, or who require training in the operation of such machines, should register also in course 5, Machine Methods in Statistics.

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Note 2. If interest warrants it, a review of college algebra will be available during September, Tuesdays and Thursdays from 4:45 to 6:15 commencing the 5th. Fee $6. This will not take the place of Mathematics 1 as a prerequisite, but is for review only. Registrations must be made by September 1st.

4. INTRODUCTION TO STATISTICAL ANALYSIS (II)—Dr. A. Sinkov; Tues. and Thurs. at 4:45 commencing Sept. 26th (2 cr.) Offered also in the spring semester.
This is a continuation of section c of course 3. Topics: Problems in the relations between two or more variables. Association and correlation, beginning with simple correlation and leading into multiple linear correlation. Introduction to the analysis of variance and its relation to correlation. Formulas will be put in form for machine calculation. Text: Mills **Statistical Methods** (Holt). See note 1 above.
  Prerequisite: Statistics 3, Mathematics 1 and 2.

5, 6. MACHINE METHODS IN STATISTICS (II)—Mr. Morris H. Hansen; Thursdays from 7 to 9 commencing Sept. 28th. (1 cr.)
First semester. The course will begin with a review of the operations on a calculator, multiplication and division, the proper treatment of decimal points, the extraction of roots, and the use of accumulative processes. Short-cut computing methods will be developed, along with the adaptation of formulas to forms best suited for short-cut calculation. (1 cr.)
Second semester. The punched card method, the functions of the principal machines, and their adaptations to particular types of problems. The instruction will not cover the actual operation or wiring of tabulating machines, but rather their use in statistical processes. The use of punched cards to obtain sums of squares and of cross products in correlation and curve fitting will be included. Methods of checking will be developed. (For work on the Hollerith machines, the time of meeting may necessarily be changed to 4:30 or 5.) (1 cr.)

Graduate and Advanced Undergraduate

*7. STATISTICAL TREATMENT OF EXPERIMENTS IN THE PLANT AND ANIMAL INDUSTRIES (III)—Dr. A. E. Brandt; Tues. and Thurs. at 4:45 commencing November 16th and ending in March. (2-3 cr.)
Special emphasis will be placed on the design of experiments, and the statistical analysis of the observations. The concept of independent comparisons or individual degrees of freedom is used. The principles of the design of experiments and the analyses proper thereto will be emphasized. Randomized blocks, Latin squares, factorial and pseudo-factorial designs will be discussed in detail; also confounding and partial confounding; examination of methods of analyzing data from experiments involving these methods. A seminar supplementing the lectures will be held on Fridays at 3 o'clock at which specific problems relating to research of interest to class members will be discussed. One hour additional credit will be given to those who carry out the special reading and calculations to be advised.
  Prerequisite: High school algebra. Opportunities will be provided in the use of more mathematics for those who are qualified. (See course 3a.)

*9. INDEX NUMBERS AND TIME SERIES (III)—Mr. C. M. Purves; Mon. at 5, commencing Sept. 25th, 1st sem. only. (2 cr.)
The problems of construction, sampling, and weighting of the various types of index numbers are taken up in this course and an analysis is made of the more commonly used index numbers of prices, production and banking statistics. The analysis of time series includes a review of the methods of measuring the components of the series, and the application of these methods to specific problems.
  Prerequisite: Statistics 1, 2, and 5.

*10. CORRELATION ANALYSIS (III)—Mr. C. M. Purves; Mon. and Wed. at 5, 2d sem. only. (2 cr.)
The application of advanced correlation methods to practical problems, particularly those involving time series. Various methods including mathematical and freehand multiple curvilinear correlations, use of logarithms and first differences and joint correlation will be applied to a specific problem. Emphasis will be placed upon the limitations of correlation in analyzing problems including time series, and the significance of results obtained. A brief review of the analysis of variance and its relationship to correlation.
  Prerequisite: Statistics 1, 2, and 5.

*11, 12. THE INTERPRETATION OF STATISTICAL CALCULATIONS (III)—Mr. Alexander Sturges; Mon. and Wed. at 4:45 commencing Sept. 27th. (2 cr.)
First semester. The philosophy and assumptions involved in statistical inference from sampling data. The conditions of sampling will be stated and compared with practical situations. The effect of failure to meet the ideal conditions will be studied. Various distributions will be illustrated by sampling experiments. (2 cr.)
Second semester. The selection and use of statistical tests. The illustrative problems will deal with single and multiple attributes,

time series, and allied situations in which the conditions of sampling are not adequately met. (2 cr.)
Prerequisites: Statistics 3 and 4, Mathematics 1 and 2.

*13, 14. GRAPHIC CORRELATION (III)—Mr. Louis Bean, assisted by Dr. Mordecai Ezekiel; Mondays from 5 to 7 commencing Oct. 2d. (2 cr.)
Theoretical examples of graphic correlation, followed by practical applications in economics and other fields. The distinctions between the formal mathematical method, the formal graphical method (Ezekiel), and the short-cut method (Bean). Problems concerning the number of variables of inter-correlation, and other aspects of the adequacy and reliability of results.
Prerequisites: High School algebra; a first course in statistics or practical experience.

15. QUANTITATIVE EXPERIMENTATION (IV, V)—Dr. C. I. Bliss; Mon. and Wed. at 5, with a two hour computing laboratory Fridays from 7 to 9. Course commences Sept. 25th and ends in December. (2 cr.)
The course deals primarily with pharmaeology and toxicology, and is nonmathematical. Topics: Determination of the individual lethal dose, with attention to sampling and graphic analysis. Comparison of toxicities. Dosage-mortality curves. Method of probits. Biological comparisons and assays based on an all-or-none response. Reaction time as a criterion of response. Graded responses. Joint action of drugs and poisons.
Prerequisites: Statistics 3 and 4.

*17, 18. ADJUSTMENT OF OBSERVATIONS (V)—Dr. W. Edwards Deming. To be offered next year, and every four years.

*19. LEAST SQUARES (IV, V)—Dr. W. Edwards Deming; due next in 1942-43.

*21, 22. MULTIVARIATE ANALYSIS (V)—Mr. M. A. Girshick; not offered this year.

*23, 24. ANALYSIS OF VARIANCE (V)—Mr. M. A. Girshick; Wednesday evenings from 8 to 10 commencing Sept. 27th; this and every fourth year.
Selections from the works of Bartlett, Fisher, Neyman, Wilks, Yates, and others will be studied, with complete mathematical development of the formulas. Attention will be paid to the sampling conditions and the validity of the inferences drawn.
Prerequisites: Statistics 21, 22; Mathematics 15, 16.

*25. ANALYTIC CURVE FITTING (IV, V)—Mr. Max Sasuly. Not offered this year.

*26. DYNAMIC ANALYSIS OF TIME SERIES (IV, V)—Mr. Max Sasuly, Not offered this year.

*27, 28. THEORY AND APPLICATION OF THE CHARACTERISTIC FUNCTION (V)—Dr. Solomon Kullback. To be offered next year, 1940-41.

*29, 30. INTERNATIONAL STATISTICS (V)—Dr. J. C. Rocca (Georgetown University); Thursdays at 4:45 commencing Sept. 28th. (1 cr.)
This is a course in documentation and methodology for students interested in the quantitative study of international economic relations. Representative topics: The statistical activities of the Health Section and the Economic Intelligence Service of the League of Nations; international agricultural, industrial, and social statistics; international movement of capital.
Prerequisites: Statistics 3 and 4; and courses in economics and international trade.

A general lecture series in the philosophy of science is being planned for the spring semester, and the attention of statisticians is invited for the reason that the problem of inference from data is closely tied up with the subject of these lectures.

MANAGEMENT
Undergraduate

PRINCIPLES OF ADMINISTRATIVE MANAGEMENT (I, II)—Dr. Eldon Lee Johnson; Mon. and Wed. at 5 commencing Sept. 25th. (2-3 cr.)
This course is designed to introduce the student to the elements of organization, personnel and fiscal management, planning, public relations, and controls of administration. Attention will be devoted to the evolution of administrative organization; organizational types; staff, line, and auxiliary agencies and functions; problems and types of coordination and controls of administration; the broadest aspects of personnel selection, classification, training, movement, and relations; budgeting and fiscal control; auditing and financial accountability; planning management; the relation of layman, expert, and administrator.

PROBLEMS IN ADMINISTRATIVE MANAGEMENT (III, IV)—Dr. Eldon Lee Johnson; Mon. and Wed. at 5. To be offered Feb. 1940. (2 cr.)

Course will deal largely with the application of principles to specific problems.

Prerequisite: Principles of Administrative Management.

METEOROLOGY
Graduate and Advanced Undergraduate

An educational program more complete than in previous years is planned by the Weather Bureau beginning with the fall semester of 1939.

Prof. C. G. Rossby, who until coming to the Weather Bureau as Assistant Chief in Charge of Research, was in charge of the Meteorological Division at the Massachusetts Institute of Technology, will conduct the educational program, which will include the following courses in the Graduate School:

DYNAMIC METEOROLOGY (IV, V)—Drs. C. G. Rossby, Horace G. Byers and Mr. H. Wexler; Mon., Wed., and Fri. from 5:10 to 6 at the Weather Bureau, commencing Sept. 25th. (3 cr.)

A thorough survey of the field including thermodynamics of the atmosphere, equation of motion of atmospheric flow, energy transformations, lateral and vertical turbance, and special problems of the general circulation. An outline of the second semester will be found in the second semester bulletin issued in January.

Prerequisites: Mathematics through ordinary differential equations; two years of college physics; general knowledge of meteorology.

DESCRIPTIVE METEOROLOGY (III, IV)—Dr. Horace G. Byers, assisted by specialists; Tues. and Thurs. from 5:10 to 6 commencing Sept. 26th. (2 cr.)

One semester devoted to a general treatment of atmospheric processes with special emphasis on methods of air mass analysis and their application to synoptic charts of the surface and upper-air and to forecasting. The course is intended to be of an introductory nature, but those without some familiarity with meteorology will be at a disadvantage.

CLIMATOLOGY (III, IV)—Dr. C. Warren Thornthwaite; Tues. and Thurs. from 5:10 to 6. To be offered in Feb. 1940. (2 cr.)

Climatology, based on newer concepts of physical meteorology. Problems of agriculture, hydrology, soil conservation, land forms, and human settlement in its relation to climatic or meteorologic conditions will be discussed.

SOIL CONSERVATION
Undergraduate

SOIL CONSERVATION (II)—Dr. Jay A. Bonsteel with the cooperation of a committee from the Soil Conservation Service. Introductory lecutres by Dr. H. H. Bennett, Chief, Soil Conservation Service. Mon. and Wed. at 5 commencing Sept. 25th. (2 cr.)

A guidance course for persons having a knowledge of basic sciences, particularly of chemistry, physics, geology, meteorology and botany such as is usually obtained in the first two years of a collegiate course leading to the degree of Bachelor of Science. Lectures, some field excursions, collateral reading, the preparation of reports.

The course is intended to give a broad general view of the physical aspects of the soil conservation problem and a basic outline of the problems involved in the causes and prevention of soil erosion; a summary of research, planning, operations, and the progress of soil conservation.

SOILS: THEIR MORPHOLOGY, GENESIS, AND CLASSIFICATION (V) —Dr. Charles E. Kellogg. To be offered in Feb. 1940. (3 cr.)

MISCELLANEOUS

BASIC PHOTOGRAPHY (III, IV)—Mr. Carl H. Hanson and other specialists; Mon. and Wed. at 4:50 commencing Oct. 2d. Fall semester only. (2 cr.)

There are no prerequisites. The course will be elementary and basic in character and will be designed to meet the needs of the amateur. Text: Air Corps Training Manual No. 2170-5, "Basic Photography," for sale by the superintendent of Documents—price 65 cents.

Tentative outline of the course:

Elementary photographic optics, selection and use of photographic lenses, cameras and shutters, films and plates, the photography of colored objects, exposure, elementary photographic chemistry, preparing solutions, darkroom arrangement, conveniences, and practices, developers and development, the technique of developing roll films, film packs and plates, the science of printing, the practice of printing, the camera in use, selection and arrangement of the subject, outdoor photography, enlarging papers, equip-

ment and devices, how to make enlargements, finishing photographic prints, miniature camera photography, home portraiture, lighting and posing in portraiture, indoor photography, line work and copying, color photography, amateur motion picture cameras, equipment, and materials.

EXTENSION EDUCATION (IV, V)—Messrs. M. C. Wilson and Barnard D. Joy; twice weekly, hour arranged to meet the convenience of class. Room 5534, South Building. Open to those with extension teaching experience, or with background of educational training satisfactory to instructor.

ORGANIZATION AND CONDUCT OF 4-H CLUB WORK—The course includes the development of 4-H Club programs and organization. It takes into consideration the methods employed in 4-H work including: Projects, club meetings, demonstrations, judging work, exhibits, achievement days, camps, short courses, and leader training.

EXTENSION ORGANIZATION AND PROGRAM PLANNING—An analytical review of the best procedures to be followed in developing State, county and community programs of work and the outlining of plans of work.

GLASS BLOWING (A laboratory course for technicians)—Dr. Leland B. Clark; Mon. and Wed. at 4:50 commencing Sept. 25th, in the basement of the Smithsonian Institution. Fee $18 a semester, including materials. Registration limited to ten students.
Simple manipulation of joining, bending, and shaping will be carried through to the production of useful apparatus. Metal in glass and glass to metal seals of all types will be made. During the first semester the so-called "soft glasses" will be utilized for practice; during the second semester the related glasses will be used. Ample opportunity for advanced work will be given those who show themselves particularly adapted to the work.

MINERALOGY: DESCRIPTIVE AND DETERMINATIVE (II)—Miss Jewell J. Glass; Tues. and Thurs. at 4:50 commencing Sept. 26th. (2-3 cr.) (Room N-1238 North Interior Building.)
Lectures: A study by inspection of the common rock-forming minerals, in hand specimens, in crystal form and in rock masses. Descriptive physical properties: External forms, structure, texture, hardness, specific gravity, cleavage, color, etc. A brief review of crystallography, and of the chemical characters of each species. Mode of occurrence and characteristic associations of each mineral. Uses and economic importance. Special lectures: Illustrated lectures and laboratory demonstration of the study of the internal crystalline structure (atomic structure) of minerals by the X-ray and electron diffraction methods, given by eminent workers in that field.
  Laboratory: Identification of mineral specimens (100 "unknown"); (a) by blowpipe analysis; (b) by qualitative chemical tests. Series of 6 Saturday afternoon field excursions, to be counted as laboratory work.
  Prerequisites: One year freshman chemistry. Physics desirable, but not required.

QUANTITATIVE MICRO-ORGANIC ANALYSIS (III, IV)—Dr. E. P. Clark; Wed. at 5. To be offered in Feb. 1940 (1 cr.)
A lecture course covering the general principles of organic analysis with special emphasis upon micro and semi-micro procedures. Consideration will be given the desirability of the several systems under various laboratory conditions, as well as the selection and fabrication of necessary apparatus for each.
  The lectures will be amply supplemented with demonstrations of equipment and manipulative procedure.

PHILOSOPHY, PSYCHOLOGY, SOCIOLOGY
Graduate and Advanced Undergraduate

HISTORY OF PHILOSOPHY (IV, V)—Dr. George S. Painter; Fri. from 5 to 7 commencing Sept. 29th. (2-3 cr.)
First semester. Greek philosophy from Thales to Modern Time.
Second semester. Modern philosophy. The history of Modern philosophy begins with the Renaissance and comes down to the present time.

LIFE AND PHILOSOPHY (IV, V)—Dr. Fritz Marti; Wed. from 5 to 7 commencing Sept. 27th. (2 cr.)
An adult introduction to philosophy. The short lectures will follow the syllabus of the course, but they will also dwell upon the problems implied in the weekly batch of student questions. At least half of the time will be given to discussion. The purpose of the course is to get acquainted with the main results of occidental philosophy and, drawing upon these results, to learn how to ask philosophical questions in such a way that an answer becomes possible.
  Syllabus for the fifteen meetings: (1) Calendar time and spiritual time; (2) freedom and responsibility; (3) individuality and personality; (4) life natural; the blessed life; (5) the community of the spirit; (6) nation, class, race, and other idols; (7) the treason of the clerks; war guilt of good folks; (8) why are we superstitious; the "need" for religion; (9) faith and doubt; (10) religion and the religions; religion and philosophy; (11) philosophy and common sense; (12) tradition and "progress"; (13) society and the state; (14) ethics and politics; (15) life and history.

READINGS IN PHILOSOPHY (IV, V)—Dr. Fritz Marti; Fri. from 5 to 7. To be offered in Feb. 1940. (2 cr.)
A service course for mature students desirous to acquire some facility in reading classical philosophical texts.

THE PSYCHOLOGY OF PERSONALITY (IV)—Dr. Paul Kaufman; Mon. and Wed. at 5 commencing Oct. 2d. (2 cr.)
A general survey of the essentials of human personality in the light of current psychology. Emphasis is given to the measurement of personality, the emotions, learning, the growth of attitudes, the subconscious, and the relations of mind and body.

Opportunity is provided for taking several of the most widely used personality tests.

The course is conducted by informal lectures and discussions for those desiring no credit. Regular reading and exercises are prescribed for students who wish credit.

This course is preliminary to the course in PROBLEMS IN THE ADJUSTMENT OF PERSONALITY to be offered in the second semester.

SOCIAL PSYCHOLOGY (IV)—Dr. Paul Kaufman; Tues. and Thurs. from 5 to 6:15 commencing Oct. 3d. (3 cr.)
The program of this course is arranged in two divisions: The psychology of group behavior and the social development of the individual. In the first are studied the collective mind of crowds, mass movements, public opinion, propaganda; and the patterns of social attitudes in the various fields of human thought and activity. In the second, after a brief review of the nature of inherited capacities and of social life, are surveyed the influences of group experience in shaping individual personality. The character, and extent of these influences are traced in the adoption of language, habits, conventions, tastes, ideas of right, privileges, and obligations. The methods of adoption, conscious and unconscious, are also examined in a consideration of the various kinds of contact and of the reactions of different types of individuals to social pressures.

Some previous understanding of elementary psychology is a desirable but not essential foundation for this course.

*PRINCIPLES OF RURAL AND URBAN SOCIOLOGY (V)—Drs. Carl C. Taylor and C. P. Loomis; Mon. and Wed. at 5 commencing Sept. 25th. (2 cr.)
A general survey of outstanding rural social problems in the United States and comparisons between urban and rural societies; between American and European rural life; and between primitive or simpler societies and modern society.

Prerequisites: One semester course in sociology and three additional semester courses in sociology and economics.

*RURAL SOCIAL PSYCHOLOGY (V)—Drs. Carl C. Taylor and C. P. Loomis; Mon. and Wed. at 5. To be offered in Feb. 1940. (2 cr.)

GENESIS AND PSYCHOLOGY OF RURAL CULTURE (IV, V)—Dr. Ernst Harms; Thurs. from 6 to 7 commencing Sept. 26th. (1 cr.)
In the first semester the genesis of rural culture will be studied. The genesis of rural culture will be treated at first as the development of the general rural activity from the prehistoric times until the higher rural cultures. Further on the development of the material implements and tools will be dealt with, such as fire, house, water, axe and hatchet, plow, etc. A survey will follow of the social forms as family, legal cultic and other communal trends from the earliest time; then some consideration of the history of the domestication of plants and animals. Finally, the non-material rural development of cloth, costume, folk-art as folk-dance, folk-song, story-telling, folk-play, and the other so-called rural arts, will be studied.

The second semester will cover the fundamentals of modern rural culture, comparing the principal European forms with the beginnings of American rural life.

SOCIAL AND LEGAL
Graduate and Advanced Undergraduate

*LABOR LAW AND LEGISLATION (IV, V)—Dr. David Ziskind; Mon. from 5 to 7:30 commencing Sept. 25th. (3 cr.)
Social legislation and the administrative problems of labor agencies. Legislation on hours, wages, and social security; and the techniques of drafting labor legislation. A study of the procedures followed before such agencies as the National Labor Relations Board, the Social Security Board, the National Mediation Board, the Division of Public Contracts, the Fair Labor Standards Division, and the various State labor departments.

UNITY IN THE LABOR MOVEMENT (IV, V)—Dr. David Ziskind; Wed. from 6 to 8:30 commencing Sept. 27th. (3 cr.)
This course will consider the internal struggles and harmonious adjustments in the labor movement. It will deal with craft and industrial unionism, dual unionism, jurisdictional disputes, amalgamations, and other forms of cooperation. It will review the historical antecedents for possible unity between the A. F. of L. and the C. I. O. (Seminar and discussion.)

THE PROBLEM OF UNEMPLOYMENT (IV, V)—Dr. David Ziskind; Wed. from 6 to 8:30. To be offered in Feb. 1940. (3 cr.)

ACCOUNTING IN THE FIELD OF LEGAL PROBLEMS (V)—Mr. Mark S. Massel; Tues. and Thurs. at 5 commencing Sept. 28th. (2 cr.)
This course is designed to present significant accounting concepts in the field of legal problems. It will include a general exposition of accounting methods in correlation with pertinent legislation, administrative rulings and case material.
Purposive character of accounting: Balance sheets, assets, liabilities, capital. Income and profit and loss statements. Reserves and deferred assets. The various types of accounts will be analyzed as problems in accounting methods and in various legal fields, such as: Stockholders' suits, income bonds, patent suits, income taxes, property taxes, fraud, estates, public utility regulation, and reorganizations. Differences in the interpretation of accounts in the various legal fields will be stressed.
Prerequisites: Two years of law, or permission of the instructor.

PATENT LAW AND PROCEDURE (IV, V)—Mr. Paul D. Boone; Fri. from 5 to 7 commencing Sept. 29th. (2 cr.)
Rules of practice in the U. S. Patent Office; preparation of applications; amendments; Patent Office action; Commissioner's decisions, such as taken up in Woolcott's manual; file histories of patents, etc.

***A SEMINAR COURSE ON THE CURRENT DECISIONS OF THE SUPREME COURT (IV, V)—Miss Charlotte A. Hankin; Fri. from 5 to 7 commencing Sept. 29th. (2 cr.) (Miss Hankin, A.B., LL.B., is Associate Editor, U. S. Supreme Court Letter and Progress of the Law in the Supreme Court.)**
A study of the decisions of the Supreme Court as they are handed down currently, week by week. It will be prefaced by consideration of the jurisdiction of the Supreme Court in our judicial set up.

***COMMERCIAL LAW (III, IV)**—This course will be given at the Department of Agriculture. Call office for further details.

***AGRICULTURE AND SOCIAL SECURITY (IV, V)—Mr. Merrill G. Murray. (See A. U. catalog.)**

***CURRENT SOCIAL LEGISLATION (IV, V)—Mr. Glen Leet.** (See ECONOMICS.)

SOURCE MATERIAL FOR RESEARCH IN THE SOCIAL SCIENCES (IV, V)—Miss A. R. Hasse. Four hours a week, time to be arranged. Call office for further details. (Miss Hasse has had extensive experience in library service and in the location and study of "source material.")

SPEECH
Undergraduate

FUNDAMENTALS OF SPEECH (I)—Mrs. Hester Beall Provensen; Tues. from 5 to 7 commencing Sept. 26th. (2 cr.)
Elementary speech training, specific to individual needs, based upon diagnostic study of individual differences and abilities. Training embraces the development of distinct utterance, voice improvement and speech in every-day social and business relationships. Each student speaks at every class meeting receiving specific and constructive criticism. Stress is placed upon vocabulary building.

EFFECTIVE SPEAKING (II)—Mrs. Hester Beall Provensen; Thurs. from 5 to 7 commencing Sept. 28th. (2 cr.) A student may enroll for one or both of the following sections:
Section 1 (1 cr.)—Thurs. from 5 to 6, SPEECH IMPROVEMENT. An intensive course for those desiring to improve their speaking voices and increase their vocabularies.
Section 2 (1 cr.)—Thurs. from 6 to 7, PUBLIC SPEAKING. The preparation and delivery of original speeches, speeches for special occasions, and the intelligent reading of script intended for radio presentation.
Enrollment limited to twenty students.

ORAL READING (I)—Mrs. Sallie M. Pease; Mon. from 5 to 7 commencing Sept. 25th. (2 cr.)

ARGUMENTATION AND DEBATE (Including work in Parliamentary Law) (II)—Dr. C. H. McReynolds; Fri. from 5 to 7 commencing Sept. 29th. (2 cr.)
The class activities include debates, panel discussions, and open forums.

VOICE DEVELOPMENT (II)—Mrs. Esther C. King; Fri. from 5 to 7 commencing Oct. 6th. First hour in classroom, the second hour in the auditorium. (2 cr.)
Voice development in talking and public speaking, including radio. Individual analysis by the voice recording machine will be

available at a nominal fee. The tuition will be $12, excluding recording fees.

Graduate and Advanced Undergraduate

PREPARATION AND PRESENTATION OF PUBLIC ADDRESSES (IV, V) —Mr. Knute E. Carlson; Fri. from 5 to 7 commencing Sept. 29th. (2 cr.)
This course will give special attention to collection, organization, and logical presentation of subject matter with various definite objectives in view.
Prerequisites: Basic public speaking or its equivalent.

WRITING
Graduate and Advanced Undergraduate

SEMINAR IN CREATIVE WRITING (III)—Mr. Edward M. Barron; Tues. and Thurs. at 5 commencing Sept. 26th. (2 cr.)
The work in the seminar is devoted to journalistic and creative writing. Detailed analyses are made of trends and current forms of the trade and the feature article, the familiar essay, the short story, the novelette, and the novel as developed in modern publications. The primary concern is with the artistry of words, facility of expression, and the mechanics of the various forms. The student's inclinations in literary work are studied and he is encouraged to develop along the paths where his natural talents lie. The course presupposes a fundamental knowledge of composition and rhetoric.

INTERPRETIVE WRITING (IV, V)—Mr. Morse Salisbury; Mon. and Wed. at 5 commencing Sept. 25th. (2 cr.)
A course of study and practice designed to help students learn the techniques of analyzing factual material from a variety of sources, synthesizing information and opinion into articles, radio talks and dialogues, and general reports which will interest and inform the general reader or listener. There will be lectures by members of the writing staff of the Office of Information and other bureaus, round-table discussions, and liberal practice work in writing interpretive articles and talks.

WRITING ADMINISTRATIVE REPORTS, MEMORANDUMS AND MANUALS (IV)—Mrs. Florence P. Marks; Tues. from 5 to 7 commencing Sept. 26th. (2 cr.)
The techniques and forms used in writing up the findings of administrative studies; the preparation of administrative and field memorandums on procedures and policies with emphasis on the organization of subject matter, modified outlining, determination of subject, form of expression, numbering, indexing and distribution; and the preparation of office manuals including the classification of material, methods of presentation, supplements, and revisions. (Course to be repeated second semester.)

GENERAL LECTURES

As in previous years, special series of popular lectures by outstanding men and women in such fields as

THE HISTORY OF SCIENCE

THE PHILOSOPHY OF SCIENCE

THE SCIENCE OF MAN

MANAGEMENT

PSYCHOLOGY

SOIL SCIENCE

and other fields will be announced from time to time.

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THE DEPARTMENT
OF AGRICULTURE
GRADUATE SCHOOL

EDUCATIONAL COURSES MAKING
FACILITIES AVAILABLE FOR
STUDY AND RESEARCH IN
THE GOVERNMENT SERVICE

SECOND SEMESTER

1939-40

WASHINGTON

CONTENTS

THE DEPARTMENT OF AGRICULTURE GRADUATE SCHOOL

SECOND SEMESTER 1939–40

Tuition $12 for two credit hours per semester, and $18 for three credit hours per semester, except as otherwise indicated. Those who desire college or graduate credits certified to a university or to the Civil Service Commission will pay $7.50 a credit hour. Students withdrawing from classes will not be entitled to refunds, except that if an announced course is not given for want of the minimum number of students (15), money paid will be returned in full.

REGISTER IN ADVANCE. Registrations for the second semester should be completed before January 27th.

Those desiring courses in subjects not included in this program should confer with others interested to see if there are enough applicants to make a self-supporting class. The minimum number required in most cases is fifteen, but special arrangements may be made with the approval of the instructors for the conduct of smaller classes.

Special series of lectures not included in this preliminary statement will be announced from time to time as plans for them are completed.

The latest catalogs of universities and colleges are available for consultation in the office of the Director. Inquiries regarding the school should be addressed to Dr. A. F. Woods, Director of the Graduate School, Room 1031 South Building, The Department of Agriculture, Washington.

Room assignments for classes may be obtained from the Director's Office after January 22d, or from the guards at the main entrances.

Any student working for academic credit should secure from the schools attended a transcript of his academic work and file it with the Secretary of the Graduate School, Mrs. Eva M. Johnson.

AUTHORITY AND OBJECTIVES

The Congress of the United States has authorized the use of facilities for study and research in the government departments by qualified individuals, students, and graduates of institutions of learning in the several States and the District of Columbia under such rules and restrictions as the heads of departments and bureaus may prescribe (Joint Res. April 12, 1892, 27 Stat. 395; Deficiency Act of March 3, 1901, 31 Stat. 1010, 1039). Under this authority and the provisions of the Organic Act, a School of Graduate Studies was organized with the approval of the Secretary of Agriculture in 1921 for the benefit of Department employees and such others as are qualified to undertake the work offered.

Executive Order No. 7916 authorizes and directs "the establishment of federal training facilities in and by the Departments and Agencies and by the Civil Service Commission."

Some of the strongest scientists of the government departments are taking charge of courses and a few of the leading graduate institutions in and near Washington have furnished teachers for others. The professional staffs of the various bureaus are mostly in the Civil Service and hold their positions by reason of merit. Most of them were originally drawn from the staffs of the leading colleges and universities, and are now practicing the subjects that they teach. Altogether a most helpful spirit has prevailed. The interest in the school has grown from year to year. Its work has been strengthened and credits granted have been accepted for graduate and undergraduate credit in many institutions. These include many of the

leading universities of the country and the Civil Service Commission.

As the work developed it became increasingly necessary to offer courses in the undergraduate levels to enable students to work out programs acceptable to graduate schools in which the student desires to register for an advanced degree. The course levels are indicated in the catalog by Roman numerals, e.g., I, freshman; IV, senior; V, graduate. Arabic numerals show semester credit hours.

Students are urged to register for work desired in local colleges when practicable. By special arrangements with some nearby institutions, especially American University, cooperative courses are organized and are available for resident credit. These are indicated by an asterisk (*). Beginning this semester only IV, V courses are included in this cooperative list.

Graduate credit can be obtained only by persons having a bachelor's degree from an accredited college. Classes meeting two clock hours a week for fifteen weeks carry two semester credits; those meeting three hours carry three semester credits. Classes running through the year earn double this number, i.e., four or six semester credits respectively. Only courses marked IV, V may be used in graduate programs. Courses in the first, second, and third year levels (I, II, III) may be required without credit if necessary for foundation training.

Work for the master's degree is largely resident work at the institution where the degree is to be taken. Not more than six units, as a rule, may be taken at another institution.

Beginning 1940-41 it may be necessary to limit registration in the undergraduate courses to employees of the government and the Agricultural Extension Service and to certify courses for academic credit only in the graduate levels.

The Department Library in room 1052 will be open from 4:30 till 6 on Fridays for students who can not go there during the regular hours.

Social Science Reading Room

As an extension of the services of the Agricultural Economics Library the Division of Statistical and Historical Research, in cooperation with the Graduate School, will open a Social Science Reading Room for employees of the Department of Agriculture and students of the Graduate School. In addition to general books and periodicals in the field of Social Science, books for Graduate School students in the Social Science courses will be on reserve. The Reading Room will be open from 8:30 to 9:00 each morning and from 4:30 to 9:00 each evening, Monday through Friday. Books may be borrowed for overnight study. Admission by card to be obtained from the Graduate School.

Office h o u r s after

January 8th f r o m

9 a. m. to 5 :45 p. m.

DETAILED DESCRIPTION OF COURSES

The asterisk (*) indicates cooperation with American University.
Roman numerals indicate college year levels.
Courses marked: Y indicates year; F, first semester; S, second semester;
R, repeated each semester if registration warrants.

ACCOUNTING

Students Specializing in Accounting Call for Special Program Sheet

Undergraduate

PRINCIPLES OF ACCOUNTING (II, 3 cr. each sem. Y,R)—Mr. Wm. H. Rowe, Dr. Oswald Nielsen, Dr. Allan J. Fisher, and Mr. G. Y. Jarvis. A two-hour LABORATORY PERIOD once a week is required unless specially excused by the instructor.

First semester. Tues. and Thurs. at 5 commencing Jan. 30th. Laboratory, Tues. 6 to 8 commencing Feb. 6th.

Elementary principles of accounting; discussion and problems. At the end of the semester students will be prepared to devise the accounting methods necessary for a small business organization, make the necessary entries in the records, draw up statements at the end of the fiscal year, adjust the accounts for accruals, deferred items, depreciation, etc., and close the books.

Second semester. Mon. and Wed. at 5 commencing Jan. 29th. Laboratory, Mon. 6 to 8 commencing Feb. 5th.

Continuation of first semester covering the more advanced principles of accounting; account classifications, the valuation of assets and depreciation policies; manufacturing accounts; partnership accounts; and corporation accounting, particularly the treatment and interpretation of capital stock, surplus, and reserve accounts.

SECOND YEAR ACCOUNTING (III, 3 cr. each sem. Y,S)—Dr. Oswald Nielsen; Fri. from 5 to 7:30 commencing Feb. 2d.

This course will include such topics as the correction of financial statements and books of account, comparative statements and the analysis of financial statements by means of financial and operating ratios and statements of sources and application of funds, statements of affairs, receivers' accounts, realization and liquidation accounts, home office and branch accounting, and consolidated statements. Considerable emphasis will be given to the solution of problems in connection with such topics.
Prerequisite: First year accounting or equivalent.

Graduate and Advanced Undergraduate

*****MATHEMATICS OF FINANCE (IV, V, 2-3 cr. F)**—Mr. Wm. H. Rowe; Tues. and Thurs. at 5 commencing Jan. 30th.

Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; determination of annual payments necessary to accumulate sinking funds and to amortize debts to installments and preparation of schedules for such accumulations and amortizations. The valuation of bonds in cases where the yield rate differs from the bond rate and the preparation of schedules for the amortization of premiums or accumulations of discounts on such bonds. Computation of depreciation by the sinking fund method, the fixed percentage of book value method, and other methods, as well as the preparation of schedules for the same will be included. Some study will be given to life probabilities, and the computation of premiums for the simpler types of life annuities and life insurance.

This course is given primarily for students of accounting, but others will be admitted. The application to accounting will be reserved until the last third of the semester. For students not taking the accounting applications the course will run for ten weeks with two hours credit; for accounting students the course will continue five additional weeks and give three hours credit. Problems will include those of types given in C.P.A. examinations.
Prerequisites: For students taking the three-hour course, Principles of Accounting.

ACCOUNTING IN THE FIELD OF LEGAL PROBLEMS—(See Social and Legal.)

*****ELEMENTARY COST ACCOUNTING (IV, 3 cr. each sem. F)**—Mr. Elmer C. Koch; Fri. from 5 to 7:30 commencing Feb. 2d.

This course includes a thorough consideration of the basic principles of cost accounting together with their practical application in the development of cost accounting procedures. By means of lectures, study of a text and the solution of problems, the student is familiarized with accounting for materials, labor and indirect expenses; the relationship of cost accounts to the financial accounts; departmental, process, sequential and job lot costs; and the uses of forms more commonly utilized in cost accounting. This is a one semester course.

*INCOME TAX PROCEDURES (IV, 3 cr. F)—Mr. John B. Payne; Mon. from 7:35 to 10:05 commencing Feb. 5th. Given at A. U., 1901 F St., N.W.

A practical course of instruction in Income Tax Law and Procedures under the Revenue Act of 1938 covering a technical discussion of the essential provisions of the Statute in its application to citizens, aliens, estates and trusts, partnerships and corporations. Lectures will be supplemented with problems illustrating the more salient features of the law and the student will be instructed in the preparation of the various Forms provided by the government to be used by different classes of taxpayers in filing tax returns. Regulations 101, relating to the Income Tax under the Revenue Act of 1938, will be furnished students for their use in the course of study.

*FEDERAL ACCOUNTING PROCEDURES (IV)—To be offered next year, 1940-41.

*FEDERAL BUDGETARY ADMINISTRATION (IV, 3 cr. F)— Messrs. F. J. Bailey and W. A. Jump; Tues. from 7:35 to 10:05 commencing Feb. 6th. Given at A. U., 1901 F St., N.W.

*AUDITING (IV, V, 2 cr. Y,S)—Mr. Theodore B. Nickson; Wed. from 5 to 6:40 commencing Jan. 31st.
Continuation of first semester.

COMMODITY EXCHANGE ACCOUNTING AND AUDITING (IV, V, 3 cr. F)—Mr. John J. Bachmann. To be offered next year, 1940-41.

BOTANY

Undergraduate

SYSTEMATIC BOTANY (II, 2 cr. Y,S)—Dr. S. F. Blake; Mon. and Wed. at 5 commencing Jan. 29th.

The second semester will be devoted to the identification of wild plants of this region by the use of a manual. One or two short field trips will be held.
Prerequisite: First semester or equivalent.

Graduate and Advanced Undergraduate

HISTORY OF BOTANIC RESEARCH (IV, V, 2 cr. each sem. Y)— Dr. O. F. Cook. To be offered Sept., 1940.

PLANT ECOLOGY (IV, V, 2 cr. each sem. Y,F)—Dr. M. B. Waite; Mon., Wed., and Fri. at 5 commencing Jan. 29th. Each semester to run for ten weeks.

General plant ecology. The ecology of cultivated crop plants will be stressed.
Prerequisites: A general knowledge of botany and of agriculture.

PLANT BREEDING WITH SPECIAL REFERENCE TO DISEASE RESISTANCE (V, 2 cr. F)—Dr. F. J. Stevenson, assisted by other specialists. To be offered Sept., 1940.

Prerequisites: B.S. degree in botany or related subject.

LANDSCAPE DESIGN (IV, 2 cr. F)—Mr. F. L. Mulford; Fri. from 5 to 7 commencing Feb. 2d.

Principles of landscape design as applied to home grounds, large and small; school and institution grounds and public parks. Use of plant material in connection with such plans and preparation of plans.

CHEMISTRY

Undergraduate

GENERAL INORGANIC CHEMISTRY—Dr. E. P. Clark; Mon. from 5 to 7 commencing Jan. 29th. Fee $12.

Designed for students whose work is not in the chemical field but who desire a general knowledge of the subject as an aid in reading and understanding other subjects in which chemistry plays a minor role. The course will consist of lectures, amply demonstrated, covering the atomic and molecular theory; valence; the gas laws; chemical equations; oxidation and reduction; the periodic law; and a general consideration of the elements. After the completion of the foregoing material a brief introduction to the system employed in quantitative analysis will be presented. This course will not carry academic credit but a certificate will be awarded upon request for satisfactory completion of the course.

AN INTRODUCTION TO ORGANIC CHEMISTRY (II, 2 cr. each sem. Y,S)—Dr. E. P. Clark; Tues. and Thurs. at 5 commencing Jan. 30th.

The fundamental principles of general organic chemistry. Such topics as classification, nomenclature, type reactions, and structure will be considered. Historically important discoveries will be correlated with the development of the subject, and emphasis will be placed upon the treatment of compounds or classes of compounds that are industrially, medically, or biologically important. The first semester was devoted to the consideration of the aliphatic series; in the second semester the aromatic and heterocyclic series will be taken up.

Graduate and Advanced Undergraduate

ADVANCED ORGANIC CHEMISTRY (IV, V, 2 cr. each sem. Y,S)—Mr. C. Verne Bowen; Tues. and Thurs. at 5 commencing Jan. 30th.

In this course fundamental reactions will be reviewed and elaborated. Newer developments in aliphatic and aromatic chemistry will be presented and recent progress in the chemistry of sterols, vitamins, and sex hormones will be given.
Prerequisites: A year of organic chemistry and a year of physics.

PHYSIOLOGICAL CHEMISTRY (IV, V, 2 cr. each sem. Y,S)—Dr. Herbert O. Calvery; Wed. from 5 to 7 commencing Jan. 31st.

Metabolism of the proteins, fats, and carbohydrates; mineral metabolism; the chemical constituents of the urine; and finally a general discussion of the chemistry and physiology of the vitamins and hormones will conclude the course.
Prerequisites: One year general chemistry; one year organic.

PHYSICAL CHEMISTRY (III, 2 cr. each sem. Y,S)—Dr. Benjamin Makower; second half to be given Wed. and Fri. at 5 commencing Jan. 31st.

Physical properties and molecular constitution, colloids, chemical kinetics, electromotive force, thermodynamics, reaction mechanism, chemical equilibrium.
Prerequisites: A year of college chemistry with laboratory; a year of college physics; calculus.

ADVANCED INORGANIC ANALYTICAL CHEMISTRY (IV, V, 2 cr. each sem. Y,S)—Dr. James I. Hoffman; Tues. and Thurs. from 6:30 to 7:30 commencing Jan. 30th.

The work in the second semester will cover volumetric analysis, organic reagents used in inorganic analyses, electrode potentials, and diagrammatic outlines of procedures used in the analysis of selected materials. The evaluation of results and a discussion of errors, precision, and accuracy will conclude the course.
Prerequisite: At least one year each of general chemistry, analytical chemistry, organic chemistry, and physical chemistry.

Graduate

CHEMICAL KINETICS (V)—Dr. Stephen Brunauer; to be offered the fall semester of next year, 1940-41.

CATALYSIS (V)—Dr. Stephen Brunauer; to be offered the spring semester of next year, 1940-41.

THERMODYNAMICS (V)—Dr. F. G. Brickwedde; to be offered next year, 1940-41.

INDUSTRIAL ORGANIC SYNTHESIS (V)—Mr. P. H. Groggins; to be offered next year, 1940-41.

BIOCHEMISTRY (V)—To be offered in 1941-42.

SELECTED TOPICS IN CHEMICAL PHYSICS (IV, V, 2 cr. each sem. Y,F)—Dr. Alfred L. Sklar; Wed. from 5 to 7 commencing Jan. 31st. (The second half will be offered in the fall semester of next year, 1940-41.)

The following topics will be discussed: Introduction to classical statistical mechanics applied to polyatomic molecules; virial coefficients; specific heats of gases and solids; Einstein and Debye theories; chemical constants. Dipole moments with applications to the structure of organic molecules, dispersion, and proteins. Atomic structure, the Pauli exclusion principles, and the periodic table of the elements. Molecular spectra, including infra-red and Raman spectra, absorption and fluorescence in the visible and ultra-violet regions, Franck-Condon principle and selection rules. The various spectra of benzene will be discussed as examples. Elementary theory of metals, insulators, and semi-conductors.

CLERICAL AND SECRETARIAL

Undergraduate

GOVERNMENT CORRESPONDENCE (II, 2 cr. R)—Mary H. Sanders; Tues. from 5 to 7 commencing Jan. 30th.

The writing of government letters from the organization of subject matter to the language of the letter, paragraphing, construction of effective sentences, and correct usage. Vocabulary building. Methods for improving expression. Development and application of appraisal standards. Discussion of the problems involved in dictating and reviewing correspondence and supervising letter writers from the standpoint of the stenographer, dictator, reviewer, and supervisor.

GOVERNMENT CORRESPONDENCE FOR DICTATORS, REVIEWERS, AND SUPERVISORS (IV, 2 cr. R)—Florence P. Marks; Tues. from 5 to 7 commencing Jan. 30th.

Designed for those who dictate and review letters or who supervise the preparation of correspondence. The course will cover the development and application of letter appraisal standards, the analysis and revision of problem letters, the organization of subject matter, the technique of dictating, the

development and training of letter writers, the procedure in making correspondence surveys, the application of check-lists for supervisors, the use and preparation of correspondence manuals.

AUDITING PROCEDURE (Government vouchers and related documents) (II, 2 cr. R)—Florence P. Marks; Thurs. from 5 to 7 commencing Feb. 1st.

This course covers the audit of standardized government vouchers, travel authority, formal contracts, informal agreements, purchase orders, tax exemption certificates, bills of lading, etc.

ADVANCED SECRETARIAL TRAINING—Alice Coffman; Fri. from 5 to 7 commencing Feb. 2d. Fee $12.

Designed for those secretaries who would develop their duties, traits, and knowledges to qualify them for a higher degree of efficient service.

From the course, the student will gain a deeper insight into the principles of governmental secretarial work and their relation to office organization, will receive help on problems of business etiquette and in meeting the demands of the vocation. Special stress will be laid upon the broader, cultural aspects of the secretary's training, and the mastery of secretarial skills.

Prerequisite: Successful completion of first semester Secretarial Course, or its equivalent.

The SECRETARIAL TRAINING course offered in the first semester will be repeated in the fall semester of 1940.

FILING AND CLASSIFICATION SEMINAR. To be offered next year, 1940-41. Prospective students should communicate with Mr. John S. Lucas of the Office of Plant Operations of the Department of Agriculture, branch 5635.

SHORTHAND AND STENOTYPY DEVELOPMENT

70 to 110 WORDS A MINUTE—Alice Coffman; Mon. and Wed. at 5 commencing Jan. 29th.

This course is designed for those who desire a review of theory in Gregg shorthand with dictation from 70 to 110 words a minute. Special attention will be given to the acquisition of a large vocabulary of Gregg outlines. Dictation will be graded from business letters and the Congressional Record; legal and technical matter relevant to the work in government offices.

Class will be limited to 25 members.

PITMAN SHORTHAND SYSTEM—Louise C. Barry; Tues. and Thurs. at 5 commencing Jan. 30th.

A comprehensive course in the principles of Pitman shorthand to enable technical, scientific and professional students and workers to record research records, addresses and other work with greater speed, accuracy and ease, and which embraces the necessary practical instruction to equip the student to write accurate Pitmanic shorthand.

100 to 150 WORDS A MINUTE—Miss Clara E. Richter; Mon. and Wed. at 5 commencing Feb. 5th.

This course is designed to develop recording speed in the more technical vocabularies. Subject matter will be selected and graded from the publications of the various bureaus in which members of the class are employed. Students must thoroughly familiarize themselves with the basic theory of the system of shorthand that they write prior to entering the class.

130 to 175 WORDS A MINUTE—Miss Clara E. Richter; Mon. and Wed. at 6 commencing Feb. 5th.

Continuation of the 100 to 150 word class with special emphasis on reporting technique.

175 WORDS A MINUTE AND UP—Miss Clara E. Richter; Tues. and Thurs. at 5 commencing Feb. 6th.

STENOTYPY—C. W. A. Draper; Tues. and Thurs. commencing Jan. 30th.

Graduated classes in dictation for junior and senior stenographers.

STENOTYPY—C. W. A. Draper; Mon. and Wed. commencing Jan. 29th.

Graduated classes in dictation for junior and senior reporters.
(Fee $12.00 for sixty hours.) For schedule of classes call for special circular.

INTERNATIONAL SHORTHAND—Mr. Fred Neter; Fri. from 5 to 7 commencing Feb. 2d.

For beginners and advanced students who are interested in taking up shorthand in German, French, Dutch, Spanish, and Italian. Persons not familiar with the respective languages may obtain preparatory training.

SHORTHAND IN SPANISH—Miss Grace Bauer; Mon. and Thurs. at 5 commencing Feb. 5th.

Study of manual and supplemental dictation, including articles and business correspondence. (Gregg system used.)
Prerequisite: Knowledge of Spanish.

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ECONOMICS

For prerequisites in these courses consult the instructor or the director.

Undergraduate

1. **PRINCIPLES OF ECONOMICS (II, 2-3 cr. each sem. Y,S)—Dr. F. L. Thomsen; Mon. and Wed. at 5 commencing Jan. 29th.**

A continuation of the first semester's inquiry into the nature, causes and effects of business "cycles." The distribution of income and wealth. Economic institutions. Political economic "isms." International economic relations.

2. **CONTEMPORARY ECONOMIC PROBLEMS (III, 2-3 cr. each sem. Y,S)—Dr. Max J. Wasserman; Tues. and Thurs. at 5 commencing Jan. 30th.**

The object of this course is to analyze in some detail the most pressing current problems of our economic organization. For the second semester special attention will be devoted to labor problems, monetary and credit problems, problems related to American agriculture, and the federal regulation of industry and trade. At the end of the course the trends of American economic policy will be examined.

2½. **COTTON CLASSING (I, II, 2 cr. F)—Mr. R. L. Kause, in cooperation with the Cotton Division, Agricultural Marketing Service; a ten weeks' course held in the Cotton Division Laboratory on the sixth floor of the Annex Building, 12th and C Sts., S.W., from 4:30 to 5 daily and 1:30 to 3:30 on Saturdays, commencing April 1st.**

A study of grade, color, staple, and preparation. Registration limited to fifteen.
(See also course No. 12—Cotton Marketing.)

Graduate and Advanced Undergraduate

3. ***SOCIAL AND ECONOMIC HISTORY OF AMERICAN AGRICULTURE (IV, 2-3 cr. each sem. Y,S)—Mr. Everett E. Edwards; Tues. and Thurs. at 5 commencing Jan. 30th.**

The elements and significance of the agricultural revolution; policies concerning the public domain since 1862; agrarian settlement since 1850, especially in the trans-Mississippi West; history and significance of the changes in farm implements and machinery; transportation facilities with reference to agricultural conditions; development of domestic and foreign markets; agencies promoting an improved agriculture (leadership; societies; fairs, periodicals; State and Federal departments of agriculture; education; sciences); agriculture during the past century by regions and commodities; recent trends (the cooperative movement; rural population and tenancy changes; efforts to effect a balanced national economy).

4. **HISTORY OF ECONOMIC THOUGHT (IV, 2-3 cr. each sem. Y,S)—Dr. Max J. Wasserman; Mon. and Wed. at 5 commencing Jan. 29th.**

An examination of the principal economic theories from Greek antiquity to the present time in the light of the institutions, customs and practices which conditioned them. Special attention will be devoted during the second semester to modern theories of purchasing power in economics.

5. **HISTORY AND DEVELOPMENT OF PRICE POLICIES (III, IV, 2 cr. F)—Dr. Richard A. Kahn; Mon. from 7:30 to 9:10 p.m. commencing Feb. 5th.**

Covers the historical development of governmental interference with price movements as fixation of maximum or minimum or average prices. Study of the price policies of public or semi-public syndicates and trusts and the governmental determination of private price fixing.

6. ***ECONOMIC THEORY (IV, 3 cr. Y,S)—Dr. Howard S. Piquet; Thurs. from 7:45 to 10:15 commencing Feb. 1st.**

7. ***LOCAL PLANNING (IV, 3 cr. Y,S)—Dr. Bushrod W. Allin and associates; Tues. and Thurs. from 5 to 6:15 commencing Jan. 30th.**

A continuation of the course, "Agricultural Program Planning," given the first semester, with special emphasis on the application of planning procedures in the field. Except by special permission, this course should be taken only by those who have had the first semester course.

8. ***AGRICULTURAL ECONOMICS (IV, 3 cr. F)—Dr. O. C. Stine; Tues. and Thurs. from 6:20 to 7:35 commencing Feb. 1st. Given at A. U., 1901 F St.**

9. ***STATE AND POPULATION (V, 3 cr. F)—Dr. Frank Lorimer; Tues. from 7:30 to 10:05 commencing Feb. 6th. Given at A. U., 1901 F St.**

10. ***WATER RESOURCES (IV, 1½ cr. F)—Mr. G. F. White; Fri. from 5 to 6:15 commencing Feb. 2d.**

11. ***FORESTRY ECONOMICS AND FOREST POLICY (V, 3 cr. F).**
Course will be arranged if suitable instructor can be obtained. Call Graduate School office after Jan. 2d.

12. ***COTTON MARKETING** (IV, 2-3 cr. F)—Dr. John W. Wright and associates; Mon. and Wed. from 5 to 6:15 commencing Feb. 5th.

This course is designed to provide a well-rounded picture of the marketing system for raw cotton as well as a broad background of information relative to the manufacturing, uses, and distributive process for cotton goods, particularly for those engaged in research or service activities that have to do with this commodity. Although primary emphasis will be placed on the market mechanism for raw cotton and its functioning through all stages of the distributive process from sale by producers to purchase by spinners and the problems incident thereto, the course will cover also the manufacturing processes and the organization of the cotton textile industry, the system of distribution of manufactured cotton goods and the general situation with respect to cotton in the present world economy.

Students taking the course for graduate credit will be held for appropriate prerequisites and will be expected to do additional work.

13. ***TAXATION AND PUBLIC FINANCE** (IV, 3 cr. F)—Dr. Fritz K. Mann; Fri. from 5 to 7:30 commencing Feb. 1st. Given at A. U.

14. ***BASIC PROBLEMS IN TRANSPORTATION** (IV, 3 cr. F)—Dr. Ludwig Homberger; Tues. from 5 to 7:35 commencing Feb. 6th. Given at A. U.

15. ***PRINCIPLES OF HIGHWAY TRANSPORTATION** (IV, 1½ cr. F)—Dr. Ludwig Homberger; Thurs. from 5 to 6:30 commencing Feb. 1st. Given at A. U.

16. ***ESSENTIALS OF GEOGRAPHY** (IV, 3 cr. F)—Dr. M. Proudfoot. (See A. U. Catalog.)

17. ***TECHNOLOGY AND MODERN ECONOMIC PROBLEMS** (IV, 3 cr. F)—Dr. R. S. Clemen; Mon. from 5 to 7:30 commencing Feb. 5th. Given at A. U.

18. ***ECONOMICS OF AGRICULTURAL PRODUCTION** (IV, 2-3 cr. each sem. Y)—Drs. S. E. Johnson and W. D. Goodsell. To be offered in fall of 1940-41.

19. ***FARM MANAGEMENT** (IV, 2-3 cr. each sem. Y)—Drs. S. E. Johnson and W. D. Goodsell. To be offered in spring of 1940-41.

20. ***FOREIGN TRADE PROBLEMS AND POLICIES IN RELATION TO AGRICULTURE** (IV, 2 cr. each sem. Y)—Mr. L. A. Wheeler. To be offered in 1940-41.

20½. **EUROPEAN AGRICULTURE** (IV, 2 cr. Y,F)—Mr. Gordon P. Boals; Thurs. from 5 to 6:45 commencing Feb. 1st.

First semester. A survey of the production, trade and government policies relating to agriculture in the various European countries with particular attention directed to the competition and demand situation for U. S. farm products. Special consideration will also be given to current war developments as they may affect the European agricultural situation. Special emphasis given to European commodity surveys following the country by country discussions.

21. ***AGRICULTURAL PRICES** (IV, V, 3 cr. F)—Dr. F. L. Thomsen. To be offered in the fall of 1940-41.

22. ***AGRICULTURAL PRICE ANALYSIS** (IV, V, 3 cr. S)—Dr. F. L. Thomsen. To be offered in the spring of 1940-41.

Graduate

23. ***THEORY AND PRINCIPLES OF AGRICULTURAL MARKETING** (V, 2 cr. each sem. Y,S)—Dr. F. V. Waugh, Mr. R. O. Been, and Dr. A. C. Hoffman; Wed. from 5 to 6:40 commencing Jan. 31st.

Emphasis of the course will be on the application of economic theory to marketing problems.

Prerequisites: At least one course in general economic theory; also a course in marketing or a year's experience in research, teaching, or regulatory work in marketing will be required. It is desirable that all students have at least a good working knowledge of ordinary algebra and that they be familiar with methods of graphic analysis.

24. ***CONTEMPORARY ECONOMIC THOUGHT** (V, 3 cr. each sem. Y,S)—Dr. Howard S. Piquet; Thurs. from 5 to 7:30 commencing Feb. 1st. Given at A. U.

25. ***SUBSISTENCE FARMING** (V, 3 cr. F)—Dr. M. L. Wilson and associates; Tues. from 5 to 7:30 commencing Feb. 6th.

Course will deal with forms of agricultural organization which are alternative to commercial scientific farming; more particularly, subsistence farming, part time farming, rural industrial communities, etc. Historical survey will be made of cooperative communities and ideologies in relation to agricultural communities. Existing projects in all parts of the world will be studied and evaluated.

26. ***IMPERFECT COMPETITION** (V, 3 cr. F)—Dr. Loyle A. Morrison; Thurs. from 7:35 to 10:05 commencing Feb. 1st. Given at A. U.

27. *SEMINAR INTERNAL MIGRATION (V, 3 cr. each sem. Y,S) —Drs. Frank Lorimer and Conrad Taeuber; Thurs. from 7:35 to 10:05. Given at A. U.

28. *ECONOMIC PLANNING IN A DEMOCRACY—(V, 3 cr. F) —Dr. Gardiner C. Means; Tues. from 5 to 7:30 commencing Feb. 6th. Given at A. U.

29. *CURRENT AND FISCAL TAX PROBLEMS (V, 3 cr. F)— Dr. Fritz K. Mann; Wed. from 5 to 7:30 commencing Feb. 7th.

30. *ECONOMIC FOREIGN RELATIONS OF UNITED STATES (V, 3 cr. F)—Dr. Lynn Edminster; Thurs. from 7:35 to 10:05 commencing Feb. 1st. Given at A. U.

31. *ECONOMICS OF INSTABILITY (V, 3 cr. F)—Dr. Mordecai Ezekiel and Mr. Louis H. Bean. To be offered in fall of 1940-41.

32. *LABOR LAW AND LEGISLATION (IV, V, 3 cr. each sem. Y,S)—Dr. David Ziskind; Mon. from 5 to 7:30 commencing Jan. 29th.

The progress of social legislation designed to improve labor standards. Legislation on child and woman labor, safety and health, accident compensation, wage payment and collection, minimum wages, unemployment insurance, and old age pensions. The administrative procedures before such agencies as the National Labor Relations Board, the Social Security Board, the National Mediation Board, the Division of Public Contracts, the Fair Labor Standards Division, and the various state labor departments.

33. *THE PROBLEM OF UNEMPLOYMENT (IV, V, 3 cr. F)—Dr. David Ziskind; Wed. from 6 to 8:30 commencing Jan. 31st.

The analysis of unemployment primarily as it has manifested itself in this country during the past several years. An evaluation of the efforts to overcome the causes and effects of unemployment. Seminar and discussion.

34. *LABOR AND THE COMMUNITY (V, 3 cr. F)—Dr. Caroline F. Ware; Fri. from 5 to 7:30 commencing Feb. 2d.

A study of labor in various types of communities, ranging from agricultural areas and company towns to metropolitan areas; mobilization of community groups, including farmers, on one or the other side in labor disputes; labor's political role; the functions, in addition to collective bargaining, performed by labor unions; the changing cultural setting and ideology within which the terms of industrial employment are set and the activities of workers are carried on.

35. *CURRENT SOCIAL LEGISLATION (IV, V, 3 cr. F)—Mr. Glen Leet; Tues. from 7:30 to 10 p.m., commencing Feb. 6th.

The field covered will include social legislation currently under Congressional consideration and will include social security, old age insurance, unemployment compensation, public assistance, health insurance, child welfare, unemployment and relief, public health, child and maternal health, venereal disease control, cancer control.

This course will be conducted on a seminar basis with a limited enrollment. There will be occasional guests present with special knowledge of particular problems considered. Reports of hearings before Congressional committees and reports of executive agencies will be used extensively as source material.

EDITING

Graduate and Advanced Undergraduate

EDITING MANUSCRIPTS ON AGRICULTURE, HOME MAKING AND RELATED SUBJECTS (IV, V, 3 cr. F)—Dr. M. C. Merrill, and the editorial, printing, and indexing staffs in the Division of Publications, Office of Information; Registration is limited to 40 students. To be offered in fall of 1940-41.

ENGLISH

Undergraduate

COMPOSITION AND RHETORIC (I, 2 cr. Y,S)—Dr. Susan E. Harman; Thurs. from 5 to 7 commencing Feb. 1st.

Study and application of the principles and mechanics of good writing. Themes, reports, book reviews.
Prerequisite: First semester or equivalent.

VOCABULARY BUILDING AND DICTIONARY STUDY (I, 2 cr. R)—Sallie M. Pease; Mon. from 5 to 7 commencing Jan. 29th.

Graduate and Advanced Undergraduate

DESCRIPTIVE ENGLISH GRAMMAR (III, IV, 2 cr. R)—Dr. Susan E. Harman; Mon. from 5 to 7 commencing Jan. 29th.

A course in grammatical principles, stressing sentence structure and correct English form. Students are required to analyze sentences by diagram and to correct examples of bad English.

APPLIED ENGLISH GRAMMAR (III, IV, 1 cr. F)—Dr. Susan E. Harman; Wed. from 5 to 6 commencing Jan. 31st.

Application of the principles of grammar in practical writing. Open only to students who have had the course in English Grammar.

ENGLISH LITERATURE AND DRAMA

Graduate and Advanced Undergraduate

ENGLISH LITERATURE SINCE 1800 (IV, V, 2 cr. F)—Mr. Albert S. Kerr; Tues. from 5 to 7 commencing Feb. 6th.
A rapid survey of the main currents in English literature since the Romantic Movement, both poetry and prose.

THE ENGLISH NOVEL (IV, V, 2 cr. F)—Mr. Albert S. Kerr; Thurs. from 5 to 7 commencing Feb. 8th.

Beginning with the late Victorians, the course will treat developments during the last sixty years, particularly the extension of the realistic method under the influence of continental writers and the new psychology. The course will consist of lectures and discussions, with a rapid reading of numerous novels. Text recommended: Pelham Edgar, **The Art of the Novel**, College Edition, (Macmillan, 1933).

RURAL NOVEL (IV, V, 2 cr.)—Miss Caroline B. Sherman. To be offered in the fall of 1940-41.

MUSIC AND LITERATURE APPRECIATION (III, 2 cr. R)—Miss Cecile Willink; Fri. from 5 to 7 commencing Feb. 2d.
Various forms of musical composition will be studied, including the folk-song, art-song, suite, fugue, sonata, symphonic poem, and symphony, illustrated by Victrola records, together with a brief history of the lives and works of the masters of music. A technical knowledge of music is not required of the student. The approach will be through précis-writing, or analysis and synthesis.

Second semester. (III, 2 cr. Y,S)—Thurs. from 5 to 7 commencing Feb. 1st.

The work of the first semester will be continued in appreciation of concert music; and the study of literature will go into more difficult selections with emphasis on criticism.

SELECTIONS FROM WORLD LITERATURE (III, IV, 3 cr. Y,S)— Dr. C. H. McReynolds; Thurs. from 5 to 7:30 commencing Feb. 1st.

Selections from the best literature of various ages and countries are read and discussed. The course consists of study, analysis, and appreciation of ideas and artistic conceptions set forth by geniuses—their philosophy of life and its significance today. Among the writers included are Tolstoy, Boccaccio, Dante, Voltaire, Socrates, Plato, Mohammed, Aristotle, Machiavelli, Cervantes, Hugo, Homer, Ovid, Nietzsche, Buddha, Rousseau, Goethe, Ibsen, Vergil, Chekhov, Molière, Horace, and Petrarch. (English and American writers not included.)

MODERN DRAMA (III, 2 cr. F)—Dr. C. H. McReynolds; Tues. from 5 to 7 commencing Feb. 6th.
The class reads and studies plays of various countries. Particular attention is given to the elements of dramatic construction, including pantomime, characterization, plot, language, feeling, and atmosphere.

ENGINEERING

Graduate and Advanced Undergraduate

ANALYTICAL MECHANICS (IV, V, 2 cr. each sem. Y,S)—Dr. F. G. Brickwedde; Tues. and Thurs. at 5 commencing Jan. 30th. (For description of course see Mathematics 22.)

RADIO ENGINEERING (IV, V, 2 cr. each sem. Y,S)—Dr. Lynde P. Wheeler; Tues. and Thurs. at 5 commencing Jan. 30th.

The theory of the vacuum tube and its use as amplifier, oscillator, and detector, and a discussion of other problems relating to transmission and reception of radio signals. Emphasis will be placed on the mathematical processes useful for the solution of radio problems.

NAVAL ARCHITECTURE (IV, 2 cr. F)—Mr. Charles L. Wright, Jr.; Tues. from 5 to 7 commencing Feb. 6th.

Determination of principle dimensions of a ship; development of ship lines; displacement and stability calculations; launching.

NAVAL ARCHITECTURE (IV, 2 cr. S)—Mr. Charles L. Wright, Jr.; Mon. from 4:45 to 6:45 commencing Apr. 1st.

Continuation of first semester beginning Oct., 1939. Trochoidal wave theory and rolling; speed and power of ships; steering.

SHIP CONSTRUCTION (IV, 2 cr. F)—Mr. Charles L. Wright, Jr.; Thurs. from 5 to 7 commencing Feb. 8th.

Mold-loft procedure; work of the steel mill; the building ways; weight estimate and strength calculations; riveting; welding; design of structural parts.

SHIP CONSTRUCTION (IV, 2 cr. S)—Mrs. Charles L. Wright, Jr.; Wed. from 4:45 to 6:45 commencing Apr. 3d.

Continuation of first semester beginning Oct., 1939. Design of deck fittings; arrangement plans; ventilation; wiring; piping; construction of deck houses; masts and rigging.

GEOGRAPHY

Graduate and Advanced Undergraduate

*INTRODUCTION TO METHODS OF QUANTITATIVE GEOGRAPHY (IV, V, 2 cr. each sem. Y,S)—Dr. John Kerr Rose; Tues. from 5 to 7 commencing Feb. 6th.

Continuing the work of the first semester, other sections of geography will be surveyed. The approach will be that of the recognition and definition of problems that can be studied by quantitative techniques. Areal indices, measures of association, and sampling methods will be given attention. The statistical techniques used will be introduced and taught as needed.

GRAPHIC PRESENTATION

Undergraduate

These subjects have a three-fold purpose: First, training in graphic expression; second, developing draftsmen as designers and supervisors in the architectural and mechanical fields; third, training in the reading of blueprints and specifications. The cost per course will be $20 per semester except as otherwise stated. Prerequisites: 15 standard high school units or equivalent.

FREEHAND DRAWING AND SKETCHING (III, 2 cr. R)—Miss Carrie C. Carte; Wed. and Fri. from 5 to 7 commencing Jan. 31st. Fee $15.

A study of light and dark, color and line. An intensive study of theory and harmony of color and composition from still life, pictorial and outdoor sketching. The student may work with any medium such as pencil, colored pencil, charcoal, water color, etc. Each student will receive individual criticism.

Sketching only, two hours a week, on Fridays from 5 to 7; fee $10.

SHADES AND SHADOWS (III, 2 cr. F)—Miss Carrie C. Carte; Mon. and Wed. from 5 to 7 commencing Feb. 5th. Fee $15.

An intensive study of the effect of the direction of light; problems in shades and shadows with relation to architectural forms and ornament. Each student will receive individual criticism.

Note.—A course in perspective may be arranged if a sufficient number desires it.

ARCHITECTURAL DRAWING (III, 2 cr. R)—Mr. G. L. Edick; Tues. and Thurs. from 7 to 9 p. m. commencing Feb. 6th.

Elementary: Geometrical problems, orthographic projections, lettering, architectural symbols. Advanced: Residence designs, working drawings, details of construction, studies of modern methods of framing, and use of building materials.

MECHANICAL DRAWING (III, 2 cr. R)—Mr. G. L. Edick; Tues. and Thurs. from 7 to 9 p.m. commencing Feb. 6th.

Elementary: Geometrical problems, orthographic projections, intersections and developments, lettering, and study of material symbols. Advanced: Studies in machine shop practice, assembly and detail drawings, scale detail drawings from measured sketches by the student.

BLUEPRINT READING (III, 2 cr. R)—Mr. G. L. Edick; Tues. and Thurs. from 7 to 9 p.m. commencing Feb. 6th.

The interpretation of standard symbols; dimensioning. Simple problems in orthographic projection requiring a small amount of drawing. The study of projection planes and sections. Some study of details of construction and plans.

VISUAL INFORMATION (III, 2 cr. F)—Mr. Paul Bissell; Tues. from 5 to 7 commencing Feb. 6th. Fee $12.

This course offers training and assistance to those who have the responsibility of producing bulletins, pamphlets, posters, exhibits, films, etc. It is a study of the psychological, aesthetic, and practical problems involved in the presentation of pertinent information with suggested methods of solving these problems. It is not necessary that students be able to draw though criticism and instruction will be given on layout, lettering, posters, photographs, and commercial art illustration.

GRAPHIC METHODS APPLIED TO RESEARCH ANALYSIS— (see statistics).

HISTORY

Graduate and Advanced Undergraduate

FAMOUS WOMEN OF HISTORY—Miss Mary Sabarth; Mon. from 5 to 6 commencing Feb. 5th. Fee $6.

New and original material is presented on the following characters:

18th and 19th Centuries

Laetitia, Napoleon's mother	Feb. 5th
Josephine, Empress of France, Napoleon's first wife	Feb. 12th
Marie-Louise, Archduchess of Austria, Napoleon's second wife	Feb. 19th
Countess Walewska and Napoleon	Feb. 26th
Mademoiselle George and Napoleon	Mar. 4th
Queen Louise of Prussia	Mar. 11th
Women in the life of Talleyrand	Mar. 18th

Lady Hamilton and Lord Nelson..........................Mar. 25th
Florence Nightingale ....Apr. 1st
Peggy O'Neil, the American Pompadour.....................Apr. 8th
Empress Eugénie, wife of Napoleon III.....................Apr. 22d
Sultan Mahmoud II and his mother (a picture of Turkey in the
    year 1825) ....Apr. 29th
Women in the life of Wagner...............................May 6th
Elizabeth, Empress of Austria.............................May 13th
Mary Mills Patrick..May 20th

HISTORY OF MODERN ART (III, 2 cr. F)—Dr. Fritz Marti; Mon. from 5 to 7 commencing Feb. 29th.

The aim is an appreciation and understanding of modern art, on the basis of its historical background and development. The course offers an introduction to all figurative arts, and to the development of style. Occidental art from the Renaissance to the present. (Two hours of illustrated lecture.)

RECENT HISTORY OF THE UNITED STATES (III, IV)—To be offered in the fall of 1940-41.

WORLD POLITICS (III, IV, 2-3 cr. F)—Dr. W. M. Gewehr; Fri. from 5 to 7 commencing Feb. 2d.

A survey of world affairs and international relations. Such topics will be considered as the origins of the World War of 1914-18, the Versailles Conference and the treaties that brought no peace; revolutions in Germany and Russia; the conditions that gave rise to Mussolini and Hitler; the nature of Naziism, Fascism and Communism; the problem of disarmament and breakdown of the peace machinery; wars in Ethiopia, Spain and China; basic issues in the Far Eastern situation; the transformation of Turkey, Balkan and Baltic problems; why Europe fights another war.

SURVEY OF LATIN AMERICA (IV, V, 2 cr. each sem. Y,S)—Dr. Ernesto Galarza; Fri. from 5 to 7 commencing Feb. 2d.

The significant aspects of inter-American relations today and their relation to historical forces: Geographic, economic, commercial, racial, military.

LANGUAGES

The standard university language course is three semester hours, each class of fifty minutes. The courses now given for two semester credits meet twice weekly for sixty minute periods. The standard requirements (3 cr.) may therefore be met by an additional thirty minutes a week. Those desiring the three semester credits in courses marked "2-3 cr." must register for them in advance, paying $18 a semester instead of $12.

Courses marked I, II are undergraduate, those marked III, IV, are advanced undergraduate or graduate.

CONVERSATIONAL CLASSES IN FRENCH (III, 2 cr. R); CONVERSATIONAL CLASSES IN GERMAN (III)—Miss Mary Sabarth; Tues. and Thurs. at 5 commencing Feb. 6th. Groups limited to 16.

These classes are designed to give facility in conversation, use of idiom and correct pronunciation, development of vocabulary in social and business dealings. Advanced classes may be organized if desired. German and French classes will be on separate days; time to be arranged.

Prerequisites: A good reading knowledge of French or German.

        CLASS 1. Prerequisite: One year French or German.
        CLASS 2. Prerequisite: Two years French or German.
        CLASS 3. Prerequisite: Three years French or German.
        CLASS 4. Prerequisite: Four years French or German.

ELEMENTARY FRENCH (I, II, 2-3 cr. each sem. Y,S)—Dr. Harry B. Humphrey; Mon. and Wed. at 5 commencing Jan. 29th.

Instruction in elements of French grammar. Reading and translation of elementary articles from selected texts. This course is designed to prepare beginners for the advanced course in French.

*ADVANCED FRENCH (IV, V, 2-3 cr. each sem. Y,S)—Dr. Harry B. Humphrey; Tues. and Thurs. at 5 commencing Jan. 30th.

ELEMENTARY GERMAN (I, II, 2-3 cr. each sem. Y,S)—Dr. C. H. Leineweber; Mon. from 5 to 7:30 commencing Jan. 29th.

*ADVANCED AND TECHNICAL GERMAN (IV, V, 2-3 cr. each sem. Y,S)—Dr. C. H. Leineweber; Fri. from 5 to 7:30 commencing Feb. 2d.

ELEMENTARY RUSSIAN (I, II, 2-3 cr. each sem. Y,S)—Dr. C. H. Leineweber; Wed. from 5 to 7:30 commencing Jan. 31st.

GERMAN TRANSLATION (III, 1½ cr. each sem. R)—Mr. Ira T. Braunstein; Wed. from 5 to 6:30 commencing Jan. 31st. Fee $9.

Prerequisites: German grammar and reading knowledge of German.

BEGINNING SPANISH (I, II, 2-3 cr. each sem. Y,S)—Miss Rubert M. Olds; Mon. from 5 to 7:30 commencing Jan. 29th.

The aim of this course is to secure accuracy and facility in the use of the language by means of drill in pronunciation, conversation, grammar, and reading.

SPANISH CONVERSATION AND COMPOSITION (II, III, 2-3 cr. each sem. Y,S)—Miss Ruberta M. Olds; Wed. from 5 to 7:30 commencing Jan. 31st.

The aim of this course is to develop ability to understand and to converse in simple idiomatic Spanish by means of a quick review in grammar, writing of short compositions, translation, and reading for enjoyment.
    Prerequisite: Beginning Spanish or its equivalent.

ELEMENTARY ITALIAN (I, II, 2-3 cr. each sem. Y,S)—Dr. Nicholas G. Barbella; Tues. from 5 to 7:30 commencing Jan. 30th.

The fundamentals of the language, with practice in conversation. Texts: Joseph L. Russo, **Elementary Italian Grammar**; Marro, **Contemporary Italian Short Stories.**

MATHEMATICAL PREPARATION FOR STATISTICS
(Courses not available this semester are shown by title only.)

The mathematical and statistical courses are under the supervision of W. Edwards Deming, Ph.D. He, or the Director, or any of the instructors, will be glad to assist students in formulating a program of study.

Undergraduate

1. **ALGEBRA (I, 2 cr.)—Mr. Harry J. Winslow; fall semester only.**

2. **TRIGONOMETRY AND ANALYTIC GEOMETRY (I, 3 cr.)—Mr. Harry J. Winslow; Tues. and Thurs., 4:45 to 6:30 commencing Feb. 1st. Spring semester only. Offered every year.**

Definitions in trigonometry; identities; complex numbers; DeMoivre's theorem; trigonometric equations. The study of analytic geometry will include the line, conic sections, and some other plane curves, polar coordinates, families of curves with one or more parameters. Parametric equations of curves. Radical axis; graphic solution of equations. Some three-dimensional geometry.
    Prerequisite: Mathematics 1 or its equivalent.

3, 4. **CALCULUS (II, 3 cr.)—Dr. W. Edwards Deming; Mon. and Fri., 4:45 to 6:30 with a few minutes intermission, commencing Feb. 2d. Offered this and alternate years.**

First semester to be offered again in the fall of 1941.

Second semester. Standard integral forms. Partial and total derivatives. Constrained maxima and minima in functions of two variables. Lagrange multipliers. Interpolation. Taylor's series with one or more independent variables. Propagation of errors. Operations with series. Multiple integrals. Line integrals. Approximate integration; the Euler-Maclaurin formula; mechanical integration. Function scales. History and application stressed. Text: Morris & Brown **Calculus** (McGraw-Hill, 1937).
    Prerequisites: Mathematics 1, 2, and 3.

5. **HIGHER ALGEBRA (III, 3 cr.)—Dr. E. J. Finan (Catholic University). Offered in alternate years; due again in 1941-42.**

6. **COORDINATE GEOMETRY AND VECTORS (III, 2 cr.)—Dr. S. B. Littauer (Naval Academy); Tuesdays from 5 to 7 commencing Feb. 6th. Spring semester only, this and alternate years.**

Lines, planes, conics, quadric surfaces. Tangents, normals, transformations, invariants. Determinants will be used freely. Problems in multiple correlation and curve fitting, and the near indeterminancy of linear equations, will be examined geometrically. The vector notation will be studied, and many of the equations involving tangents and normals will be compressed by vector notation.
    Prerequisites: Mathematics 1, 2, 3, 4.

Graduate and Advanced Undergraduate

*8. **INTERPOLATION AND FINITE DIFFERENCES (V)—Dr. W. Edwards Deming; offered every four years; not given until 1942-43.**

*9. **MATHEMATICS OF INVESTMENT (IV, V)—Messrs. Eugene Rasor and Dorrance C. Bronson, F.A.S. Not offered this year.**

*11, 12. **ADVANCED CALCULUS (IV, V)—Offered in alternate years, due in 1940-41.**

13, 14. **DIFFERENTIAL EQUATIONS (IV, V)—To be offered in 1941-42, or earlier if the demand is sufficient.**

*15, 16. **LINEAR ALGEBRA (V)—Mr. M. A. Girshick. Offered every third year, due 1941-42.**

*17, 18. **THEORY OF INFINITE PROCESSES (V, 2 cr.)—Dr. C. Winston (Railroad Retirement Board), Tuesday evenings from 8 to 10 commencing Feb. 6th; this and every third year.**

Infinite aggregates, convergent and divergent sequences. Theory of the real variable. Differentiation; Riemann and Lebesque integration. Power series, expansion of functions, series with variable terms, transformation and reversion of series. Continued fractions. Infinite determinants. History and applications.
    Prerequisites: Mathematics 11 and 12; Mathematics 5 also advised.

*19, 20. THEORY OF FUNCTIONS (V)—Mr. M. A. Girshick. To be offered next year, 1940-41.

21, 22. ANALYTICAL MECHANICS (IV, V, 2 cr.)—Dr. F. G. Brickwedde (National Bureau of Standards); Tues. and Thurs. at 5 commencing Feb. 5th.

The course begins with some lessons in vector algebra, after which the study of statistics and dynamics is taken up in vector notation, with practice in translating the equations into Cartesian and other coordinates. Fundamental principles, general problems such as vibrations of damped systems, the gyroscope, wave motion, some potential theory relativity dynamics, and topics of special interest to the class. The equations of Lagrange and Hamilton will be included. Similarities with thermodynamics and electricity will be pointed out. Text: Ames and Murnaghan **Theoretical Mechanics** (Ginn).

Prerequisites: Mathematics 3 and 4; college physics and a first course in statics and dynamics.

23, 24. SELECTED TOPICS FROM THE HISTORY AND PHILOSOPHY OF MATHEMATICS (V)—Professor Tobias Dantzig (University of Maryland). To be offered next year.

Other mathematical courses are listed under statistics
on the following pages.

STATISTICS

PREFATORY NOTE

Most if not all problems of inference from data in agriculture are not and can not be made purely statistical, but must involve close attention to the scientific aspects. There is no such thing as being trained in statistics without being trained also in some branch of science and in philosophy. In conjunction with the courses in statistics, the student is earnestly urged to pursue studies in these lines of thought; such work constitutes an intangible prerequisite to progress in statistical inference. Moreover, any course, statistical or otherwise, necessarily receives its character from the instructor, wherefore students planning to undertake work in statistics are advised to look forward to a well-rounded program, not to be curtailed until a number of points of view have been acquired. Mathematics in various degrees, both as a tool and as a mode of thought, is indispensable to studies in statistics, and it is a rule that students working for credit in any course must come prepared with the stated mathematical prerequisites. Dr. Woods, Dr. Deming, and other members of the staff will be glad to assist students in drawing up programs of study.

SEMINARS IN STATISTICS. Meetings are held twice monthly under the direction of Dr. Deming. Membership is limited to people who can contribute original work or a survey of journal articles. This is not a credit course, and no fee is charged. Applications should be sent in writing to the Director.

1, 2. GRAPHIC METHODS APPLIED TO RESEARCH ANALYSIS (I, 2 cr.)—Mr. R. G. Hainsworth; Tues. and Thurs. from 5 to 7 commencing Feb. 1st. Fee $15.

First semester offered only in the fall.
Second semester. Maps: How to interpret them; when and how to use them; their preparation and adaptability; examples of data as applied to statistical and geographical maps. Actual working examples of multiple dot, circle, pie diagram, cross hatch, line, basic outline, and typographic and physiographic types will be given.

3. INTRODUCTION TO STATISTICAL ANALYSIS, 1st half (II, 2 cr.)—Dr. Solomon Kullback; Tues. and Thurs. at 5 commencing Feb. 1st.

Designed for students of business and economics. The collection of economic and census data; the presentation of data in tables and graphs; different kinds of averages; measures and significances of dispersion; elementary principles of sampling; introduction to index numbers and time series. Preparing formulas for machine calculations. Students needing the use of a machine with supervision should register also for course 5.

Prerequisites: Mathematics 1 and 2.

4. INTRODUCTION TO STATISTICAL ANALYSIS, 2d half. Section b (I, 2 cr.)—Dr. Richard O. Lang assisted by Dr. Paul Glick (Bureau of the Census); Mon. and Wed. at 5 commencing Feb. 5th. To be offered also next fall.

This is a continuation of section b of course 3, 1st semester. It is a nonmathematical elementary course designed for statistical clerks who wish to become familiar with the more common statistical terms and formulas, and with forms for laying out calculations, and checking. Topics: Problems in the relations between two or more variables. Some curve fitting. Association and correlation, from simple correlation to more complicated problems. Scatter diagrams, some work in interpretation of statistical calculations. Students needing the use of a machine with supervision for machine calculations should register also for course 5. Text: A. E. Waugh **Elements of Statistical Method,** and **Laboratory Manual** (McGraw-Hill, 1938).

Prerequisite: Statistics 3.

Section c (II, 2 cr.)—Mr. Sidney Wilcox (Chief Statistician, Bureau of Labor Statistics); Tues. and Thurs. at 5 commencing Feb. 1st.

This is a continuation of section c of course 3, 1st semester. Topics: Problems in the relations between two or more variables. Association and correlation, beginning with simple correlation and leading into multiple linear correlation. Introduction to the analysis of variance and its relation to correlation. Formulas will be put in form for machine calculation. Students needing the use of a machine with supervision for machine calculations should register also for course 5.

Prerequisites: Statistics 3, Mathematics 1 and 2.

5. **MACHINE METHODS IN STATISTICS, 1st half (II, 1 cr.)—Mr. Robert B. Steffes (Bureau of Labor Statistics); Wed. evenings from 7 to 9 commencing Feb. 7th. Fee $8.**

The course will cover the basic operations on a calculator, short cut methods, accumulative, successive, and duplex processes, extraction of roots, and the application of these methods to simple statistical problems. The use of the slide rule, nomographs, tables and other mechanical devices will be studied if time permits. Text: Loring Wood, **Machine Methods in Statistics**, Part I (Revised).

If the demand is sufficient, other sections will be arranged on Tues. and Fri. evenings from 7 to 9 for students who need the use of calculating machines in connection with problems assigned in other courses in statistics.

6. **MACHINE METHODS IN STATISTICS, 2d half (II, 1 cr.) —Mr. Loring Wood (Bureau of Labor Statistics); Fri. from 5 to 6 commencing Feb. 9th.**

This is a course in the fundamental processes of the punch card method of statistical tabulation. It will be primarily a lecture course, but will include a limited number of demonstrations of actual machine operation. The use of the machines in connection with a number of special problems will be studied, including the cumulation of squares and cross products in correlation and curve fitting.

Graduate and Advanced Undergraduate

7. **STATISTICAL TREATMENT OF EXPERIMENTS IN THE PLANT AND ANIMAL INDUSTRIES (III, 2-3 cr.)—To be offered in the fall of 1940-41.**

9. **INDEX NUMBERS AND TIME SERIES (III, 2 cr.)—Mr. C. M. Purves; fall semester only.**

10. **CORRELATION ANALYSIS (III, 2 cr.)—Mr. C. M. Purves; Mon. and Wed. at 5 commencing Feb. 5th.**

The application of advanced correlation methods to practical problems, particularly those involving time series. Various methods including mathematical and freehand multiple curvilinear correlations, use of logarithms and first differences and joint correlation will be applied to a specific problem. Emphasis will be placed upon the limitations of correlation in analyzing problems including time series, and the significance of results obtained. A brief review of the analysis of variance and its relationship to correlation.

Prerequisites: Statistics 3 and 4.

*11, 12. **INTERMEDIATE STATISTICS (IV, 2 cr.)—Dr. William G. Madow. To be offered next year.**

Dealing mainly with the correlation of data. Simple, multiple, and partial correlation; curve fitting; tests for randomness; canonical correlation; factor analysis. Not highly mathematical, but presupposing first courses in statistics, and a working knowledge of calculus.

13, 14. **THE INTERPRETATION OF STATISTICAL CALCULATIONS (III, 2 cr.)—Mr. Alexander Sturges; Mon. and Wed. at 5, second half, commencing Feb. 5th. First offered only in the fall.**

Second semester. The selection and use of statistical tests. The illustrative problems will deal with single and multiple attributes, time series, and allied situations in which the conditions of sampling are not adequately met.

Prerequisites: Statistics 3, 4, 13; Mathematics 1 and 2.

15, 16. **GRAPHIC CORRELATION (III, 2 cr.)—Mr. Louis Bean, assisted by Dr. Mordecai Ezekiel. To be offered next year, 1940-41.**

18. **THEORY OF PROBABILITY (III, 2 cr.)—Mr. M. A. Girshick; Thursdays from 6:30 to 8:30 p.m., commencing Feb. 7th.**

An introductory course in mathematical probability dealing with definitions and fundamental operations, Bayes' formula and Laplace's generalization, Bernoulli's theorem, law of large numbers, expectations. Continuous variables, the normal curve, and introductory topics in statistics. Some history.

Prerequisites: Mathematics 1, 3, 4.

19, 20. **STATISTICAL METHODS FOR RESEARCH WORKERS, first half (III, 2 cr.)—Dr. William G. Madow; Tuesday evenings from 8 to 10 commencing Feb. 6th. The second half of the course will be given in the fall semester next year.**

The chief aim is the understanding of R. A. Fisher's book of the same title. Supplementary material will be introduced for comparison with other methods; also for dealing with time series, and the representative method in sampling. The treatment will be nonmathematical.

Prerequisites: A first course in statistics, and high school algebra.

22. SAMPLING METHODS IN SOCIAL AND ECONOMIC DATA (III, 2 cr.)—Messrs. J. Stevens Stock and Lester R. Frankel; Tuesdays from 5 to 7, with an intermission, commencing Feb. 2d.

Theory, history, and present day applications of the representative method. Accuracy and precision. Fallacies of the total count. Selections of the sample. Sampling without replacement. The analysis of variance in making estimates of precision. Choice of sampling units.
Prerequisites: Mathematics 1; Statistics 3, 4, 9, 10, or equivalent.

*23. INTERNATIONAL STATISTICS (IV, V, 2 cr.)—Dr. J. C. Rocca (Georgetown University); Wednesdays at 5 commencing Jan. 31st.

This is a course in documentation and methodology for students interested in the quantitative study of international economic relations. Representative topics: The statistical activities of the International Institute of Agriculture, of the International Statistical Institute, and of the League of Nations. International industrial, financial, and social statistics.
Prerequisites: Statistics 3 and 4, and courses in economics and international trade.

*25, 26. ADJUSTMENT OF OBSERVATIONS (V)—Dr. W. Edwards Deming. To be offered next year, and every four years.

*27, 28. LEAST SQUARES (V)—Dr. W. Edwards Deming; due next in 1942-43.

*29, 30. MULTIVARIATE ANALYSIS (V)—Mr. M. A. Girshick; not offered this year.

*31, 32. ANALYSIS OF VARIANCE (V)—Mr. M. A. Girshick; Wednesday evenings from 8 to 10 commencing Feb. 7th. Offered this and every fourth year.

First semester. To be offered again in 1943-44.

Second semester. The general problem of analysis of variance will be considered from the point of view of testing a class of hypotheses known as linear hypotheses. Generalizations to the multivariate case will be studied. Emphasis will be placed on applications and the design of experiments.
Prerequisites: Statistics 29, 30, 31; Mathematics 15, 16.

*33. ANALYTIC CURVE FITTING (IV, V)—Mr. Max Sasuly. Not offered this year.

*34. DYNAMIC ANALYSIS OF TIME SERIES (IV, V)—Mr. Max Sasuly. Not offered this year.

*35, 36. THEORY AND APPLICATION OF THE CHARACTERISTIC FUNCTION (V)—Dr. Solomon Kullback. To be offered next year, 1940-41.

A general lecture series in the philosophy of science is being planned for the spring semester, and the attention of statisticians is invited for the reason that the problem of inference from data is closely tied up with the subject of these lectures.

MANAGEMENT
Graduate and Advanced Undergraduate

PROBLEMS OF ADMINISTRATIVE MANAGEMENT (III, IV, 2 cr. F)—Dr. Eldon L. Johnson, chairman; Mon. from 5 to 7 commencing Feb. 5th.

The object of this course is to supplement, elaborate upon, and further illustrate the theories, principles, and practices briefly discussed in "Principles of Administrative Management" and, particularly, to demonstrate their practical application to typical administrative problems. A question period and general discussion will follow informal lectures given by experienced specialists from the Department of Agriculture, other government agencies, and educational institutions. Names of these persons will be announced later, after a definite schedule has been arranged. Time will be approximately evenly divided among problems of (1) organization and general management, (2) personnel administration, and (3) financial management.
Prerequisite: Principles of Administrative Management or consent of the Director of the Graduate School

SUPERVISORY TRAINING (IV, V, 2 cr. F)—Mr. Henry H. Farquhar and specialists; Fri. from 5 to 7 commencing Feb. 16th.

This course is designed to present the principles and practices of sound supervision and the basic aspects of the supervisor's job. Emphasis will be placed upon the relations of the supervisor to the organization; the factors of leadership, guidance and instruction; meeting responsibility and exercising authority; planning work and allocating it into specific jobs; making efficiency ratings; training employees; and daily activities and responsibilities.

PRINCIPLES OF EMPLOYEE TRAINING (IV, V, 2 cr. F)—Mr. Presley W. Melton; Mon. from 7:30 to 9:30 p.m. commencing Feb. 5th. (The instructor, now Training Officer for the Bureau of the Census, was formerly employed in the Dept. of Agr. as Chief of the Training Section. Before coming to Washington, Mr. Melton was Asst. Supt. of Marshall Field and Co., charge of the company's industrial relations and its Chicago suburb stores.)

A series of fifteen seminar discussion meetings. Subjects to be discussed will include objectives of employee training; laws and regulations affecting

employee training; organization of staff training offices; qualifications of training officers; enlisting executive support for training programs; conference procedure; breaking in new employees; understudy and intern procedure; apprentice training; correspondence training; use of visual aids; relations with educational institutions.

PROBLEMS IN ADMINISTRATION AND SUPERVISION (IV, V, 2 cr. F)—Mr. Presley W. Melton; Mon. from 5 to 7 commencing Feb. 5th.

A series of fifteen seminar discussion meetings. Subjects to be discussed will include improving organization; planning budgets; selecting competent employees; breaking in new employees; promoting and terminating employees; building morale; cooperating with division chiefs; holding staff meetings; training supervisors; maintaining relations with civic and trade associations; writing for press and radio; using visual aids in public speaking.

The course will be open to division chiefs and, by special arrangement with the instructor, to other persons with several years' experience in administrative or supervisory work in government, commercial, or industrial agencies.

METEOROLOGY

Graduate and Advanced Undergraduate

An education program more complete than in previous years is planned by the Weather Bureau beginning with the fall semester of 1939.

Prof. C. G. Rossby, who until coming to the Weather Bureau as Assistant Chief in Charge of Research was in charge of the Meteorological Division at the Massachusetts Institute of Technology, will conduct the educational program, which will include the following courses in the Graduate School:

DYNAMIC METEOROLOGY (IV, V, 3 cr. each sem. Y,S)—Drs. C. G. Rossby, Horace R. Byers and Mr. H. Wexler; Mon., Wed., and Fri. from 5:10 to 6 at the Weather Bureau, commencing Feb. 5th.

A thorough survey of the field including thermodynamics of the atmosphere, equation of motion of atmospheric flow, energy transformations, lateral and vertical turbulance, and special problems of the general circulation.

Prerequisites: Mathematics through ordinary differential equations; two years of college physics; general knowledge of meteorology.

DESCRIPTIVE METEOROLOGY (III, IV)—To be offered in the fall of 1940-41.

CLIMATOLOGY (III, IV, 2 cr. F)—Dr. C. Warren Thornthwaite; Tues. and Thurs. from 5:10 to 6 at the Weather Bureau, commencing Feb. 6th.

Climatology, based on newer concepts of physical meteorology. Problems of agriculture, hydrology, soil conservation, land forms, and human settlement in its relation to climatic or meteorologic conditions will be discussed.

SYNOPTIC WEATHER MAP ANALYSIS (IV, V, 2 cr. each sem. Y,S)—Dr. Horace R. Byers and Mr. B. C. Haynes; meeting of class by special arrangement with instructors, commencing Feb. 5th.

A laboratory course open to not more than twelve students. The first semester covers practice in the analysis of synoptic charts of the surface and an introduction into upper-air analysis. The second semester will be a continuation of surface analysis with added emphasis on various upper-air charts and the application of modern forecasting methods. The first semester of this course will be offered again in the fall of 1940-41.

SOIL CONSERVATION

Graduate and Advanced Undergraduate

SOILS: THEIR MORPHOLOGY, GENESIS, AND CLASSIFICATION (IV, V, 3 cr. F)—Dr. Charles E. Kellogg; Tues. and Thurs. from 5 to 6:15 commencing Feb. 5th.

The nature of soils and the broad principles governing their behavior are first discussed, followed by consideration of soil morphology, formation, and classification. Particular attention is given to the characteristics of the great soil groups and their genesis in relationship to the physical and biological forces of the environment. The soil geography of the United States is dealt with broadly, but some examples from other parts of the world are used. Throughout the course, the relationships of soil characteristics to agricultural development, soil use and conservation, and patterns of human occupancy are emphasized.

Prerequisites: Freshman chemistry or its equivalent. Previous or collateral reading in plant physiology, geology, geography, and logic would be helpful, but not essential.

SOILS AND PLANNING—SEMINAR (V, 1 cr. F)—Dr. Charles E. Kellogg; Fri. at 5 commencing Feb. 2d.

Seminar discussions dealing with the use of the data and techniques of soil science in land classification and land-use planning. Present problems of coordination of soil data with those from other disciplines will be dealt with and illustrated with particular examples.

SOIL CONSERVATION—To be offered in 1940-41.

MISCELLANEOUS

BASIC PHOTOGRAPHY—To be offered in the fall of 1940-41.

EXTENSION EDUCATION (IV, V)—Messrs. M. C. Wilson and Barnard D. Joy; twice weekly, hour arranged to meet the convenience of the class. Room 5534, South Building. Open to those with extension teaching experience, or with background of educational training satisfactory to instructor.

EXTENSION METHODS

The various means and agencies employed in extension teaching, such as result demonstrations, method demonstrations, meetings, news articles, personal service, bulletins, exhibits, circular letters, extension schools, and radio, will be carefully analyzed from the standpoint of their teaching function, adaptability to different subject matter, relative influence, relative cost, and interrelationship. It also includes consideration of ways of measuring extension progress; the influence of such factors as size of farms, land tenure, educational training, age, and contact with extension workers upon effectiveness of extension teaching.

GLASS BLOWING (A laboratory course for technicians) (2 cr. Y,S)—Dr. Leland B. Clark; Mon. and Wed. at 4:50 commencing Jan. 29th, in the basement of the Smithsonian Institution. Fee $18 a semester, including materials. Registration limited to ten students.

Simple manipulation of joining, bending, and shaping will be carried through to the production of useful apparatus. Metal in glass and glass to metal seals of all types will be made. During the first semester the so-called "soft glasses" were utilized for practice; during the second semester the related glasses will be used. Ample opportunity for advanced work will be given those who show themselves particularly adapted to the work.

MINERALOGY: DESCRIPTIVE AND DETERMINATIVE (III, IV, 3 cr. each sem. Y,S)—Miss Jewell J. Glass; Tues. and Thurs. at 4:50 commencing Jan. 30th.

Lectures: A study by inspection of the common rock-forming minerals, in hand specimens, in crystal form and in rock masses. Descriptive physical properties: External forms, structure, texture, hardness, specific gravity, cleavage, color, etc. A brief review of crystallography, and of the chemical characters of each species. Mode of occurrence and characteristic associations of each mineral. Uses and economic importance. Special lectures: Illustrated lectures and laboratory demonstration of the study of the internal crystalline structure (atomic structure) of minerals by the X-ray and electron diffraction methods, given by eminent workers in that field.
  Laboratory: Identification of mineral specimens (100 "unknown"); (a) by blowpipe analysis; (b) by qualitative chemical tests. Series of 6 Saturday afternoon field excursions, to be counted as laboratory work.
  Prerequisites: One year freshman chemistry. Physics desirable, but not required.

QUANTITATIVE MICRO-ORGANIC ANALYSIS (III, IV, 1 cr. S)—Dr. E. P. Clark; Wed. at 5 commencing Jan. 31st. Fee $6.

A lecture course covering the general principles of organic analysis with special emphasis upon micro and semi-micro procedures. Consideration will be given the desirability of the several systems under various laboratory conditions, as well as the selection and fabrication of necessary apparatus for each. The lectures will be supplemented with demonstrations of equipment and manipulative procedure.

PHILOSOPHY, PSYCHOLOGY, SOCIOLOGY

Graduate and Advanced Undergraduate

HISTORY OF PHILOSOPHY (IV, V, 2-3 cr. Y,F)—Dr. George S. Painter; Fri. from 5 to 7 commencing Feb. 2d.

Greek philosophy from Thales to Modern Time.

Second semester to be offered in the fall of 1940-41. Modern philosophy. The history of Modern philosophy begins with the Renaissance and comes down to the present time.

READINGS IN PHILOSOPHY (IV, V, 2 cr. F)—Dr. Fritz Marti; Wed. from 5 to 7 commencing Jan. 31st.

A course for mature students desirous to acquire some facility in reading philosophical texts. No prerequisite. The course is planned as an introduction to philosophy, and the text or texts read will be chosen from the works of great philosophers so far as they are accessible and useful in content, and obtainable in reasonably priced editions. The choice will be made on the basis of the specific needs of the class.

PROBLEMS IN THE ADJUSTMENT OF PERSONALITY (IV, V, 3 cr. F)—Dr. Paul Kaufman; Mon. and Wed. from 5 to 6:15 commencing Feb. 5th.

A survey of the common personality problems of normal people. The emphasis is on maladjustments arising from emotional conflicts; and considerable attention will be given to the origins of these conflicts in the unconscious. Techniques of self-analysis and methods of solving the difficulties are described.

SOCIAL PSYCHOLOGY (IV, V, 3 cr. each sem. Y,S)—Dr. Paul Kaufman; Tues. and Thurs. from 5 to 6:15 commencing Feb. 6th.

The program of this course is arranged in two divisions: The psychology of group behavior and the social development of the individual. In the first are studied the collective mind of crowds, mass movements, public opinion, propaganda; and the patterns of social attitudes in the various fields of human thought and activity. In the second, after a brief review of the nature of inherited capacities and of social life, are surveyed the influences of group experience in shaping individual personality. The character, and extent of these influences are traced in the adoption of language, habits, conventions, tastes, ideas of right, privileges, and obligations. The methods of adoption, conscious and unconscious, are also examined in a consideration of the various kinds of contact and of the reactions of different types of individuals to social pressures.

Some previous understanding of elementary psychology is a desirable but not essential foundation for this course.

*RURAL SOCIAL PSYCHOLOGY (V, 2-3 cr. Y,S)—Dr. Carl C. Taylor; Mon. and Wed. at 5 commencing Jan. 29th.

This course deals with the psychology and social psychology of rural groups—communities, institutions, farmers' organizations, and rural classes; with the customs, traditions, and folkways of rural peoples; and with the interactions between rural and urban cultures. It gives special consideration to what may be called the folklore of rural society, and the influence of farm practices and relative isolation on the attitudes, opinions, and philosophies of farm people. Specific topics such as suggestion, imitation, public opinion, farmer pressure groups, and farmers' movements will be discussed.

Prerequisites: Either one course in social psychology, or one course in sociology and one course in psychology.

*RURAL COMMUNITY ORGANIZATION (IV, V, 2 cr. F)—Drs. Carl C. Taylor, Chas. P. Loomis and Douglas Ensminger; Mon. from 7:30 to 9:30 commencing Feb. 5th.

The role of the community in action and planning programs; the historical background of communities in the various regions of the United States and in other countries; community organization; leadership and means of developing it.

*FARMERS IN A CHANGING WORLD (IV, V, 2 cr. F)—Mr. Gove Hambidge, Chairman, Editor of the Yearbook of Agriculture, assisted by experts in the various aspects of the subject; Thursdays from 5 to 7 commencing Feb. 8th. Fee $20.

This course will be based largely on material contained in the 1940 Yearbook of Agriculture, now in preparation and not to be published until after the course is over. The Yearbook for 1940 deals with most of the fundamental factors that affect agricultural policy, especially in the United States. The course will therefore be exceptionally broad. It will attempt to trace the development of agricultural policy since Colonial days; deal with the relation between agriculture and the general welfare; outline the major problems facing American farmers today, including the efforts to solve them; give the viewpoints of various social sciences on the farmer's problems; show the effect of democratic traditions and of scientific research on agricultural policy; and forecast the main developments that may be expected during the next decade or so. Lectures will be given by experts in various fields who have been writing on these subjects for the Yearbook.

SOCIAL AND LEGAL

Graduate and Advanced Undergraduate

*LABOR LAW AND LEGISLATION—(See Economics).

THE PROBLEM OF UNEMPLOYMENT—(See Economics).

*LABOR AND THE COMMUNITY—(See Economics).

ACCOUNTING IN THE FIELD OF LEGAL PROBLEMS (V, 2 cr. each sem. Y,S)—Mr. Mark S. Massel; Tues. from 5 to 7 commencing Feb. 6th.

This course is designed to present significant accounting concepts in the field of legal problems. It will include a general exposition of accounting methods in correlation with pertinent legislation, administrative rulings and case material.

Purposive character of accounting: Balance sheets, assets, liabilities, capital. Income and profit and loss statements. Reserves and deferred assets. The various types of accounts will be analyzed as problems in accounting methods and in various legal fields, such as Stockholders' suits, income bonds, patent suits, income taxes, property taxes, fraud, estates, public utility regulation, and reorganizations. Differences in the interpretation of accounts in the various legal fields will be stressed.

Prerequisites: First semester or equivalent, two years of law, or permission of the instructor.

PATENT LAW AND PROCEDURE (IV, V)—Mr. Paul D. Boone. To be offered in the fall of 1940-41.

Rules of practice in the U. S. Patent Office; preparation of applications; amendments; Patent Office action; Commissioner's decisions, such as taken up in Woolcott's manual; file histories of patents, etc.

*A SEMINAR COURSE ON THE CURRENT DECISIONS OF THE SUPREME COURT (IV, V)—Miss Charlotte A. Hankin. To be offered in the fall of 1940-41.

*BUSINESS LAW (IV, 3 cr. each sem. Y,S)—Mr. Walter H. Young; Tues. from 5 to 7:30 commencing Jan. 30th.

*SOURCE MATERIAL FOR RESEARCH IN THE SOCIAL SCIENCES (IV, V)—Miss A. R. Hasse. To be offered in the fall of 1940-41.

SPEECH

Undergraduate

FUNDAMENTALS OF SPEECH (I, 2 cr. R)—Hester Beall Provensen; Tues. from 5 to 7 commencing Feb. 6th.

Elementary speech training, specific to individual needs, based upon diagnostic study of individual differences and abilities. Training embraces the development of distinct utterance, voice improvement and speech in everyday social and business relationships. Each student speaks at every class meeting receiving specific and constructive criticism. Stress is placed upon vocabulary building.

EFFECTIVE SPEAKING (II, 2 cr. R)—Hester Beall Provensen; Thurs. from 5 to 7 commencing Feb. 8th.

A student may enroll for one or both of the following sections:
Section 1 (1 cr.)—Thurs. from 5 to 6, SPEECH IMPROVEMENT. An intensive course for those desiring to improve their speaking voices and increase their vocabularies.
Section 2 (1 cr.)—Thurs. from 6 to 7, PUBLIC SPEAKING. The preparation and delivery of original speeches, speeches for special occasions, and the intelligent reading of script intended for radio presentation.
   Enrollment limited to twenty students.

ORAL READING (II, 2 cr. R)—Sallie M. Pease; Tues. from 5 to 7 commencing Feb. 6th.

PERSUASIVE AND ARGUMENTATIVE SPEAKING (II, 2 cr. F)— Dr. C. H. McReynolds; Mon. from 5 to 7 commencing Feb. 5th.

A course in speech, featuring: Psychology of the audience—kinds of audiences, fundamental interests, psychological mechanics, suggestion; Speech construction—the brief, the outline, evidence, authority, subjective vs. objective speeches, variety, humor; Speech delivery—personality, action, gesture, pause, kinds of emphasis, and contact with the audience. There are speeches, round table discussions, open forums, and debates. Each student speaks at every session.

VOICE DEVELOPMENT IN PUBLIC SPEAKING (II, 2 cr. F)— Esther C. King; Fri. from 5 to 7 commencing Feb. 9th. First hour in classroom, the second hour in the auditorium.

Voice development in talking and public speaking, including radio. Individual analysis by the voice recording machine will be available at a nominal fee. The tuition will be $12, excluding recording fees.

Graduate and Advanced Undergraduate

PREPARATION AND PRESENTATION OF PUBLIC ADDRESSES (IV, V)—Mr. Knute E. Carlson. To be offered in the fall of 1940-41.

WRITING

Graduate and Advanced Undergraduate

SEMINAR IN CREATIVE WRITING (III, 2 cr. R)—Mr. Edward M. Barron; Tues. and Thurs. at 5 commencing Feb. 6th.

The work in the seminar is devoted to journalistic and creative writing. Detailed analyses are made of trends and current forms of the trade and the feature article, the familiar essay, the short story, the novelette, and the novel as developed in modern publications. The primary concern is with the artistry of words, facility of expression, and the mechanics of the various forms. The student's inclinations in literary work are studied and he is encouraged to develop along the paths where his natural talents lie. The course presupposes a fundamental knowledge of composition and rhetoric.

INTERPRETATIVE WRITING (IV, V)—Mr. Morse Salisbury. To be offered in the fall of 1940-41.

WRITING ADMINISTRATIVE REPORTS, MEMORANDUMS AND MANUALS (IV, 2 cr. F)—Florence P. Marks; Mon. from 5 to 7 commencing Feb. 5th.

The techniques and forms used in writing up the findings of administrative studies; the preparation of administrative and field memorandums on procedures and policies with emphasis on the organization of subject matter, modified outlining, determination of subject, form of expression, numbering, indexing and distribution; and the preparation of office manuals including the classification of material, methods of presentation, supplements, and revisions.

PLAY WRITING (IV, V, 2 cr. F)—Miss Rebecca Dial; Tues. and Fri. at 5 commencing Feb. 6th.

Analysis of the one-act play; technique and practice in creative writing; selecting the plot germ; arrangement of the setting, development of plot, characterization, and dialogue. Individual criticism of scripts and preparation of the manuscript for the producer.

PLAY PRODUCTION (IV, V, 1 cr. F.)—Miss Rebecca Dial; Tues from 6 to 7 commencing Feb. 6th.

Selecting a play for production, casting, and the technique of producing. This course is designed especially to help extension workers who desire to use this type of educational procedure. Opportunity afforded for production of the most suitable scripts in cooperation with the Department "Players."

GENERAL LECTURES

DR. HORNELL HART of Duke University will present a course of five lectures Fridays 5 to 6 dealing with problems of personality, beginning March 22d. Send for further information.

As in previous years, special series of popular lectures by outstanding men and women in such fields as

> **THE HISTORY OF SCIENCE**
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> **THE PHILOSOPHY OF SCIENCE**
>
> **THE SCIENCE OF MAN**
>
> **MANAGEMENT**
>
> **PSYCHOLOGY**
>
> **SOIL SCIENCE**

and other fields will be announced from time to time.

SPECIAL NOTICE

Series of 8 lectures, by the eminent cytologist, Dr. Jean Dufrenoy, Professor of Botany, University of Bordeaux, France, entitled: THE REACTION OF THE PLANT CELL TO PATHOGENS, VIRUSES, NUTRITIONAL DEFICIENCIES, AND PHYSICAL STIMULI.

The eight lectures as outlined by Dr. Dufrenoy will cover the following subject matter: Cell Constituents; Vital Staining: materials and technique; Shape of the Vacuole and Type of Staining, as correlated to the Contents of the Vacuolar Solution and to Cell Metabolism; Exchange of Water between Vacuolar Solution and Cytoplasm; Drought Resistance and Hardness; Water-soaking and Susceptibility to Disease; Oxidation Reduction Systems in the Vacuolar Solution; Respiration, Assimilation, and Storage; Chondriome and Plastidome; and Nutritional Aspect of Chloroplast Differentiation.

Auditorium, South Building; January 2, 3, 4, 5, 9, 10, 11, 12, 1940; fee $5.00; time 8 to 9 p. m.

PUBLICATIONS OF THE GRADUATE SCHOOL

	Price	Postage U. S.	Postage Foreign
ON LEAST SQUARES by W. Edwards Deming	$1.50	3c	15c
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ON THE STATISTICAL THEORY OF ERRORS by W. Edwards Deming and Raymond T. Birge	35c	1½c	4½c
LECTURES ON THE STATISTICAL METHOD by Walter A. Shewhart, edited by W. Edwards Deming	$2.50	3c	12c
ADMINISTRATIVE MANAGEMENT by outstanding leaders in that field paper binding cloth binding	75c $1.00	1½c	7½c
CURRENT ECONOMIC PROBLEMS by outstanding leaders in that field	50c	4½c	22½c
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UNDERSTANDING OURSELVES: A SURVEY OF PSYCHOLOGY TODAY by outstanding leaders in that field	50c	3c	12c
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Cheques accepted, U. S. and British stamps accepted.